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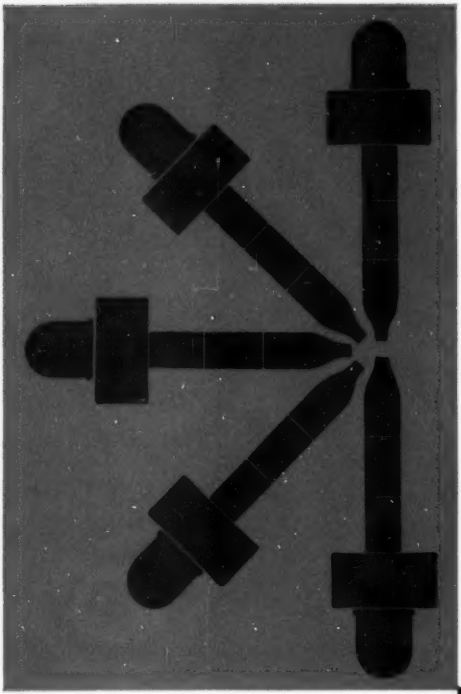

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1. Greenhill, J. P.: Principles and Practice of Obstetrics, ed. 10, Philadelphia, W. B. Saunders Company, 1951, pp. 103-104; 311; 332.

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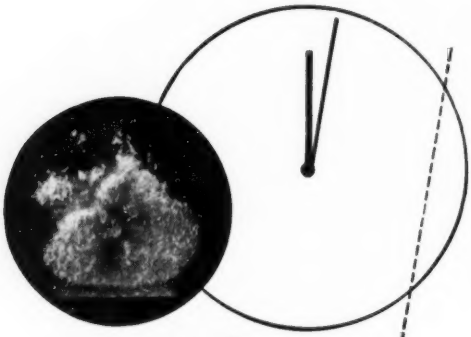

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THE Review of Gastroenterology

(INCORPORATING THE AMERICAN JOURNAL OF GASTROENTEROLOGY)

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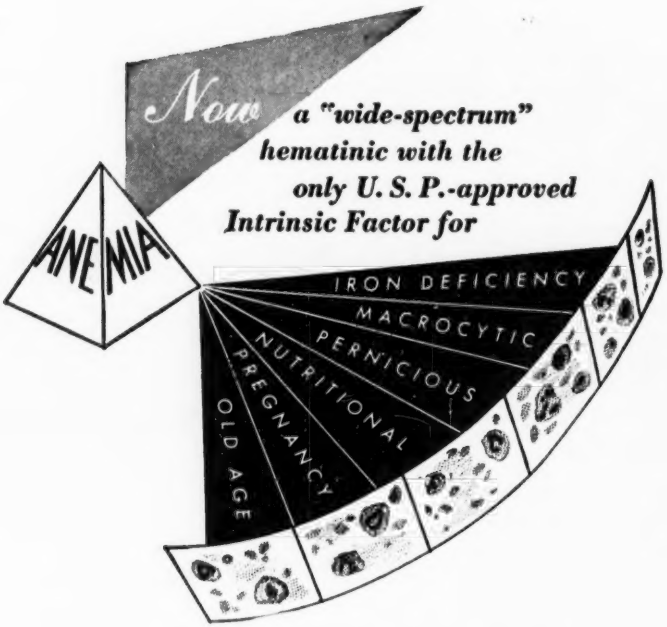
1. Rogers, M. P., and Gray, C. L.: *Am. J. Digest. Dis.* 19:180, 1952.



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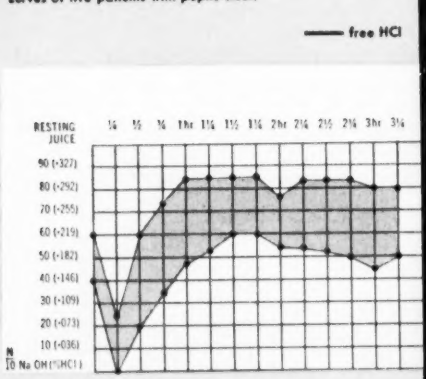

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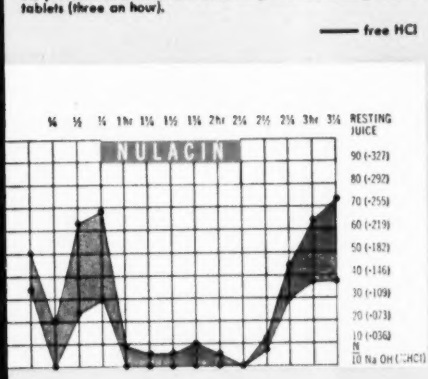

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1. Douthwaite, A.H., and Shaw, A.B.: The Control of Gastric Acidity, Brit. M. J. 2:180 (July 26) 1952.

2. Douthwaite, A.H.: Medical Treatment of Peptic Ulcer, M. Press 227:195 (Feb. 27) 1952.

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PANEL DISCUSSION ON GASTROINTESTINAL X-RAY METHODS, DIAGNOSIS AND TREATMENT*

WILLIAM W. LERMANN, M.D.
Pittsburgh, Pa.
LAY MARTIN, M.D., F.A.C.P.
Baltimore, Md.
FREDERIC W. BANCROFT, M.D., F.A.C.S.
New York, N. Y.
and
SYDNEY WEINTRAUB, M.D.
New York, N. Y.

Dr. Lermann:—This discussion today was intentionally planned because many men state that in various parts of the country they are receiving what they consider inadequate gastrointestinal x-ray examinations. Some of the men say they feel it is due perhaps to the fact that many institutions are so busy that volume is being substituted for careful, detailed work.

I think the first question we will take up today is a general discussion of what is considered an adequate gastroenterological x-ray examination. This question is proposed because in some parts of the country the tendency of roentgenologists to shorten their examination has been noted, and because they tend entirely to lose sight of the fact that there is just as great a need on the part of the gastroenterologist for a medical clearance as for a surgical clearance. Too frequently we find an x-ray examination conducted by giving the patient barium by mouth in the morning, a six-hour film follows, then castor oil, and a barium enema the next morning. This, of course, naturally, enables a surgical x-ray opinion to be given, meaning that the patient does not have surgical lesions in the gastrointestinal tract; however, it does not give enough medical x-ray opin-

*Presented before the Seventeenth Annual Convention of the National Gastroenterological Association, New York, N. Y., 20, 21, 22 October 1952.

ion, as a gastroenterologist always desires to know not only what the filled stomach and the small bowel reveal, but also the exact emptying time of the stomach, and wants to have a good study of the small bowel, and a twenty-four hour study of the colon, since no motility studies of the colon can be made with only a barium enema.

A patient may be just as uncomfortable and just as ill with a medical gastroenterological problem as with a surgical gastroenterological problem.

What is considered to be an adequate gastroenterological x-ray examination?

I think it might be well if Dr. Weintraub would be the first discusser of this question.

Dr. Sydney Weintraub:—This is a very difficult question to answer because it involves many factors: 1) whether the patient is examined in the hospital as a subject for teaching; 2) whether the patient is examined in a private office and is able to pay the rather high fees that are charged today for x-ray examination; 3) whether the patient is examined in an O.P.D. of some hospital.

At our institution, as the years have gone by, the gastrointestinal examinations have become more and more extensive and complicated; as a matter of fact, they almost "throw the book" at every patient who complains of a little distention or belches a few times. The reason for this is that the resident recalls a case in which the patient belched, and a barium enema revealed an unsuspected carcinoma of the colon, so every case after that receives a barium enema.

The resident may have a good argument in his favor. Everyone has had the experience of being forced by the patient to order examinations which he thought unnecessary. The patient is worried and probably has a cancer-phobia. Much to our chagrin, we turn up a silent carcinoma of the right colon!

Now, as to the routine at the New York Hospital, most patients that enter the out-patient clinic or the wards, and have gastrointestinal symptoms receive the following examinations: they start with the gallbladder first; the barium enema on the second day, and the gastrointestinal series the third day, and since we have established the rapid method of doing the small bowel series, which takes only half an hour to an hour, about 30 to 40 per cent of these patients receive a small bowel series, and, of course, we do pick up unsuspected lesions in a certain percentage of cases.

When I was in charge of the gastrointestinal department at the old Cornell Clinic, we analyzed a thousand cases in which we had fairly well-trained gastroenterologists taking very thorough histories and physical examinations, and at the end of each one of these examinations they wrote down their clinical impression. No matter how well trained they were, they were correct in only 75 per cent of the cases. These were errors either of omission or commission.

A patient may give a very good ulcer history, and no ulcer is found, but we may find a diseased gallbladder. If a patient does have legitimate complaints referable to the gastrointestinal tract, I don't see how you can avoid doing all these examinations. There are other factors which come in. I mean the question of time and expense. The only way I can see that you can shorten the time in examination would be perhaps to combine the gallbladder series with the gastrointestinal series. In that way you would save one day, but to do a barium enema on the same day as you do a gastrointestinal series is not good practice, because the flexures will obscure either the greater curvature of the stomach, or you will not be able to delineate your duodenum properly. It does not always occur, but it occurs often enough so that we don't attempt to do it.

As to the question of motility—I must say that we don't pay as much attention to it, perhaps, as we should. We are a little confused about motility. Before the war we used to take a six-hour film on every patient, and a twenty-four-hour film, but, as time went on, we found it was very inconvenient to keep a patient around for six hours, or have him come back. We shortened it to three hours, and took a three-hour film, and a twenty-four-hour film.

Then we found that while disturbance of motility may be important in a certain percentage of patients, it is rather small, and it was more important for us to find out if the patient had a gross lesion of the colon, so we substituted the barium enema for the twenty-four-hour film. Then, during the war we had a great shortage of help, and there weren't enough people to take the patients to and from the wards, so we instituted a one-hour film, had the patient wait in the department and, much to our surprise, we found that the vast majority of stomachs were almost half to three-quarters empty in an hour, and in a goodly percentage, the head of the meal was down in the cecum. Then we started to experiment with our rapid method of small bowel studies, and when we began to use normal saline solution as the vehicle for the barium, the transit time was tremendously increased.

We took a hundred cases and gave them the barium and water mixture, and 22 per cent reached the cecum within one hour. With the barium saline mixture at room temperature, 55 per cent reached the cecum in one hour, so we are a little confused as to what is normal transit time through the small intestine and colon.

Now all our cases receive a one-hour film unless there is some indication that there is obstruction, and we may take a three- or six-hour film, but ordinarily the one-hour film is routine.

I think I have answered most of the question, for the present.

Dr. Lermann:—You have heard the technical side of this question. I would ask Dr. Bancroft what he considers an adequate gastroenterological x-ray examination.

Dr. Frederic W. Bancroft:—I should like to answer that question in a roundabout manner. It seems to me that to the practicing surgeon there are two types of patients that present themselves for examination:

First, there is the patient who has no definite lesion nor symptomatology of a lesion but who, because of all the public education of the Cancer Committees, desires to exclude the possibility of cancer in his intestinal tract.

We all know that a careful abdominal physical examination may miss a lesion in the colon or in the stomach and I think we are considerably perturbed by this particular problem, largely because of the question of economics. If this patient has to undergo a complete workup and lose three or four days of work, that presents a financial problem due to the cost of the x-rays and the loss of time from work. Therefore, I do believe that a spot gastric film and a barium enema could and should be given at a very much lower cost.

I'd like to cite a few figures on the cost of operating cancer detection clinics. During a three-year period it took 31,426 examinations to find 91 cases of cancer at a cost of $531,879, or nearly $6,000 per patient. Of course to the one patient in whom cancer is detected it is worth $6,000, but the clinic and not the patient pays for it. So much for the elimination of the symptom-free cancer-conscious patient.

The second type is the patient with symptomatology of pathology in the gastrointestinal tract. I think we surgeons are just as anxious as the average gastroenterologist to have a thorough and adequate x-ray examination, and even then we often fail. We are just as anxious as they are to find out whether there is a six-hour retention and whether there may or may not be regional ileitis that one would miss on incomplete radiological examination.

I can remember in my own practice three cases of carcinoma of the stomach undetected by x-rays. Excellent radiological departments, and one of them was Dr. Weintraub's, reported a negative diagnosis of carcinoma in each case, but the symptomatology was so strong that I had one of them gastroscoped and a lesion was picked up. The other two we explored surgically because in each case I was sure from the history that the patient must have carcinoma despite negative radiological evidence. Therefore, I feel that in the type of case where there are real symptoms, we cannot be too careful.

In a discussion with Dr. Weintraub before this meeting, he stated that at a prominent teaching hospital, in a case of duodenal ulcer with a niche, if at the end of a year or two symptoms recur, the patient has to go through the whole gastrointestinal gamut and be out of work for two or three days, and this is not just for a checkup on the stomach itself. That, I imagine, is custom, but from the patient's point of view, it is hard, and I think our problem, or my problem particularly, comes from feeling that I would like to have the patient get to the hospital if he needs surgery, before all of his money has been taken away so that he cannot pay hospital bills or pay me.

Dr. Lermann:—Thank you, Dr. Bancroft. That was quite a stimulating talk.

What some of us originally had in mind was simply to try to arrive at what we, in all branches of medicine, surgery, and gastroenterology, could consider was an adequate x-ray examination for the gastrointestinal patient of today; that is the idea back of this symposium.

Dr. Martin, would you discuss the medical aspects of this question?

Dr. Lay Martin:—In determining the extent of x-ray diagnostic procedures, the medical man has an advantage over the roentgenologist and the surgeon. The medical man, much of the time, thinks he knows what is the matter with the patient and will, accordingly, ask for that type of x-ray examination which he thinks is indicated. If his opinion is correct, if he has reasons for his opinion, and orders a certain type of gastrointestinal x-ray, that is probably an adequate gastrointestinal examination. As I say that, however, I realize that that is quite smug. How many times have I wondered what part of the gastrointestinal tract was affected if any? It is in these instances we need a planned regime for gastrointestinal x-ray investigation.

I do not know that the opinions given by any of us three are really helpful to the physicians in small localities. We are all in plush institutions where we have the best people doing the work for us. If I were in the New York Hospital, I would talk to Dr. Weintraub and say, "Here is the problem. What do you think we should do?" and between the two, we might arrive at a conclusion which allowed the examination to be finished in a reasonable period of time. But you can't ask the roentgenologist to carry your load. Sooner or later, you have to do it yourself.

The diagnosis is the responsibility of the internist, so, if he is in a quandary, it may be better that he should order a complete gastrointestinal x-ray study. The more competent the physician, the less the complexity of laboratory and x-ray tests. The technic we use at Hopkins is practically similar to that which has just been outlined by Dr. Weintraub. I think it takes too long, but those are the facts. I do not know how to do it in a smaller space of time. I should love to reduce the cost. I do not know how to do that.

Now, as to the significance of gastrointestinal motility. I have written about the subject, but I do not know as much now as I thought I did. I do not know what the emptying time of the stomach is or, if the stomach empties very rapidly. I do not know what it means, if the small intestine empties rapidly or if barium in the small intestine reaches the colon within thirty minutes. If barium leaves the stomach in what one might consider a reasonable period of time, say four to six hours, and if that barium remains in the intestinal tract at the end of ten to twelve hours, and if it stays in the intestinal tract after the patient has had a meal, that means something. It does not always mean he has a lesion necessitating surgery, but generally it does.

In our experience the twenty-four-hour film is a waste of time and money. If one wishes to study the colon, there is only one way to do it—that is with a barium enema.

Dr. Lermann:—Thank you, Dr. Martin. I think we have established two or three very definite things.

We will go on to the second question. New diseases and new medicines require new medical methods for diagnosis, and this naturally applies to the field of roentgenology.

Dr. Weintraub, what are the new developments in the field of gastrointestinal examination in the last year or two?

Dr. Weintraub:—I hadn't given much thought to that question. I think more and more the dependence on just x-ray films alone is being frowned upon, and a careful fluoroscopy with spot films of the mucosa is of extreme importance. It is not very new, for it has been done for the last twenty-five or thirty years, but it is surprising how many roentgenologists in this city don't have a spot film device, and attempt to make diagnoses of lesions of the gastrointestinal tract. Now, routinely, we take a spot film of the stomach with one or two swallows of barium, showing the mucosa, and every bulb is spotted four times on one small 8 x 10 film with a varying amount of pressure, and different rotations; that is, in the erect position, then another routine film with the patient in a supine position, turned toward the left, which fills out the fundus and also shows the mucosa of the pyloric end of the stomach, and very often the entire duodenal swing. Those are the routine films taken on all patients, and I think they are very important.

No matter how good a fluoroscopist you may be, you are going to miss the tiny niches which you bring out with your pressure spot film.

Another advance is the study of the colon with air insufflation. That is the new method that is used down in Texas, with colloidal barium and pumping in air at the same time that you pump in the barium. It is rather a time-consuming and expensive examination. It requires at least six films 14 x 17, with the patient taken in the Trendelenburg, supine, and prone positions, and the various decubitus positions. It is a good procedure in a private office, but we can't do it in the hospital very well because an examination like that takes almost half to three-quarters of an hour, and we have the request for at least six to eight air studies a morning. We, therefore, must still rely on the old method of putting a small amount of barium in, up to the splenic flexure; the patient evacuates, and then you pump in your air, and take the necessary spot films.

The group down in Texas showed some very beautiful films at the exhibits and I believe it is a good method. We have tried it at the hospital but, much to my chagrin, some of the polyps that we showed up with the old method we could not show up with the new method; on the other hand, they will show up

polyps which we didn't show up. It is still a difficult problem. The only way I can answer it is that if you feel the patient is bleeding from the colon, and the first examination does not reveal anything, try, and try again, but, first, make sure he hasn't internal hemorrhoids.

I can speak freely before a group of gastroenterologists. One of our members of the staff noticed bright red blood in the stools for the past two years, on four different occasions. Each time he was proctoscoped and a barium enema was done, also an air study. This was his fourth study and when I reported to him I could not see anything, he was frantic. He said he wanted to see me. I wasn't taking care of him; I was just the radiologist, but he wanted to talk this thing over with me. I found out that while ordinarily he was regular in his bowel habits, now and then he became constipated and on those occasions he was likely to have the bleeding from the rectum, and I said, "I think you have internal hemorrhoids. I am going to send you to a real proctologist, a man who taught me how to examine the rectum."

You can't feel internal hemorrhoids. You can't see them from the outside. You may seem them with the long proctoscope, but you can miss them. If you use the short anoscope and have him bear down, they will pop into view, and then you rub up and down and make them bleed and you know you have made the diagnosis. It is surprising how few men know that, and it has nothing to do with radiology, but it shows the problems that are presented to us. We have to find a lesion by x-ray when the clinician should have found it.

Now, the only other advance that I can think of at the moment is the method we have started at the New York Hospital about three or four years ago, the rapid method of small bowel examination. I don't know how many of you are familiar with it, but I will just take a moment to describe the method. It had been noted by one of us after a hearty Sunday dinner, and after drinking two glasses of ice water, that there was a very rapid passage of the gastric content through the gastrointestinal tract, and it produced a diarrhea. With that experience in mind, we started to experiment in giving ice water to a patient after he had the barium, to see if we could speed the barium through the intestinal tract.

Well, ice water did it, but it gave a false mucosal pattern. We tried cold bicarbonate of soda solution. That went through even faster. Again the pattern was abnormal and not until we heard that Dr. Ross Golden, at Presbyterian, was using normal saline as his vehicle to obtain a more normal mucosal pattern of the stomach and duodenum, did we try iced normal saline, and we found that it worked; that it did not distort the pattern.

In our first series of cases, about 125, both normal and abnormal, we found that the examination was completed in 91 per cent in one hour, with four films. After the patient was examined, the regular gastrointestinal examination, stomach and duodenum, and the films taken, he was given an eight-ounce glass of iced

saline, between 34° and 38°, and in five minutes we took a 14 x 17 film of the abdomen, and then we gave him another glass of iced saline, waited ten minutes and took another film, then no more saline, but in fifteen minutes, that is, thirty minutes from the start of the examination, we took the third film. In 81 per cent the examination was completed. We had a complete filling of the entire small bowel, and it was a continuous filling. In another 10 per cent it took an additional half hour, so that in 91 per cent it was completed in an hour. The other 9 per cent were delayed, and there was reason for the delay. In some cases, where there was considerable pylorospasm, there was delay; and also in patients who are debilitated, who have received a good deal of sedation, and in certain psychoneurotic patients, we had delay.

Now, the delay in the small bowel study is important. For instance, in sprue, that is one of the main objective findings. With the conventional method it takes six to eight hours before the barium reaches the cecum. In our cases there was a relative delay. It took two and a half to three hours; we consider with our method one hour is the upper limit of normal for the barium to reach the cecum.

After the third film is taken, the films are shown to the radiologist, who then fluoroscopes the patient and spots the various areas, particularly the terminal ileum and the cecum. Since our initial study we have done over 1,300 small bowels series. We have done a large number with both methods and feel that the rapid method is superior in all types of cases. There is only one type of case where we do not attempt it, and that is with the postoperative stomach. They empty too rapidly as it is.

Dr. Lermann:—I will ask the doctor if he will tell us what effect the barium in the normal salt solution may have on the progress through the colon?

Dr. Weintraub:—It does go rapidly. One of my colleagues uses it as a mild cathartic on his patients.

Dr. Riffin:—Do you suspend your barium in saline?

Dr. Weintraub:—Yes.

Dr. Lermann:—After these questions have been answered, there will be a discussion and question period.

Dr. Bancroft, from the surgical side, do you have any comment on this question?

Dr. Bancroft:—Physicians working in smaller hospitals are often handicapped by the difficulty of obtaining good radiological service in acute emergencies admitted during the night. This is particularly so in cases of suspected intestinal obstruction.

Drs. McLanahan and Watt of Johns Hopkins have demonstrated a very important aid in diagnosis of early intestinal obstruction by scout flat abdominal

films. They showed that the *valvulae conniventes* are circular in the jejunum; that the ileum is a flat tube without *valvulae conniventes*, and that in the colon, the *valvulae conniventes* are only partially circumferential. If the surgeon will carefully study scout films in prone, erect and right lateral decubital positions, he may be able to localize the area of obstruction.

Another problem is diagnosing traumatic rupture of the spleen. The rupture in the spleen often seals off and three or four days after injury, there may be excessive hemorrhage and the patient may die. It is true that one can put in a diagnostic needle and if blood is found in the peritoneal cavity, that is an important diagnostic aid. But there is another method that I think helps, and that is to give the patient a barium swallow and place him in the Trendelenburg position. If there is a space between the cardia and the diaphragm, that is unquestionably free fluid beneath the diaphragm and in this case blood. Still another method is to have the patient in the erect position and administer a Seidlitz powder. One can see the relationship of the gas bubble in the cardia to the diaphragm. If there is a space between, it indicates free fluid. I think, however, the Trendelenburg position is better because of fluid gravitating downward.

By placing the patient in the Trendelenburg position and giving a barium swallow, a hiatus hernia may be discovered. Hiatus hernia often causes symptoms suggesting cardiac diseases, and the hernia will not show in the ordinary prone or supine positions.

Dr. Lermann:—Dr. Martin, would you like to comment on this question?

Dr. Martin:—A medical man doesn't know much that is new in roentgenology, but I do know that Dr. Russell Morgan has developed a method of making motion picture studies of gastrointestinal system by fluoroscopy that is rather new. It does need quite a bit of study but at least a beginning has been made.

I should like to ask Dr. Weintraub if it is feasible to develop sterio-projections of the bowel or stomach, and, furthermore, if it is feasible to use an eye adapter for sterio-fluoroscopic examinations of the stomach or colon?

As I listened to the description of administering large quantities of cold water to produce rapid small bowel motility, there awakened in me the thought that some of the recipients are not going to be so comfortable with all that cold water poured into them. Also, I wonder what is the effect of cold water to increase the rapidity of peristalsis. Is this a direct action of the mucous membrane? Is the stimuli mediated through the plexus of Auerbach or Meissner, or do the sympathetic sensory end organs pick up the sensation, send it into the central nervous system from which the vagus is in turn reacted?

Dr. Lermann:—The next question is: What would you consider a satisfactory roentgenological study for a case of suspected pancreatic disease? Dr. Weintraub!

Dr. Weintraub:—I can answer that very briefly. Unfortunately, pancreatic neoplasms of the body and tail are almost impossible to diagnose roentgenologically. Carcinoma of the head of the pancreas, if it impinges upon the duodenum, may be diagnosed, that is, we may venture a diagnosis. As you know, either you have invasion with a filling defect, or you have a widening of the swing, and it is quite simple to make the diagnosis and, of course, in all cases where carcinomas are suspected, right lateral films are very important to show the displacement of the duodenum or the stomach, by the mass.

We have no direct visualization of the pancreas itself, and I feel that in an individual in whom one suspects the presence of carcinoma clinically, and all the x-ray examinations are negative, that exploration is the proper procedure after that.

Dr. Bancroft:—May I ask about the decubital position? I keep thinking of a bedside ulcer.

Dr. Weintraub:—The patient lying on the side.

Dr. Lermann:—We will now go on to the next question, which I think really has been partially, at least, answered, and that is: If a patient is given castor oil or some laxative in preparation for a barium enema, what time should elapse after the laxative is administered, before the enema is given, so that the muscle irritability of the colon produced by the laxative doesn't interfere with the proper visualization? If a patient comes in having had a laxative, and already has had perhaps a half-dozen bowel movements, and has just completed one, his bowel is irritable, and he has a little bit of cramp, and so forth, then is it all right to give him the barium enema at that time, and, if you did, would you get complete visualization, would it be much more successful if a longer time elapsed?

Dr. Weintraub:—The question of preparation for barium enema is one which bothers us and concerns us greatly. We have found from our experience that there is only one cathartic for a barium enema, and that is castor oil, and also for some reason or other the castor oils made today are not as efficient as they were in my day when I was younger. One ounce doesn't touch the average patient any more. You have to give two ounces. The castor oil is too refined. On the other hand, we have great difficulty in prevailing upon the referring physicians to instruct the patient to take castor oil, and they say, "Well, we will give him licorice powder instead." It seems in our institution licorice powder works for the urologists but doesn't work for the gastroenterologists.

Then I have had this experience: you have a nice patient, you don't want to inconvenience him too much, and you want him to think very well of you, and you say, "What cathartic do you use if you need one?"

He says, "If I take one 5 grain cascara tablet, it works, and it works before breakfast".

So I say, "Take three".

But for some reason, on this occasion, there has been no result from the three tablets. So I have stopped compromising. They get castor oil, unless there is a suspicion that there is an obstructive lesion, I mean.

Then the question of enemas—now, if the patient has had a good result with the castor oil, as a rule it is unnecessary to give enemas in addition, but in hospital routines it is awfully difficult to leave anything to choice, so you find most of the patients come down having had enemas in addition, and no doubt those colons are somewhat irritable.

I should like to tell this story: one of my old patients came to me and he said, "I want a complete checkup", as so many do.

"What is wrong with you?"

"Oh, nothing, but I want a complete checkup".

He at one time had some difficulty. He had an irritable colon. I said, "Well, we can do you as an ambulatory patient".

"No", he said, "I want to come into the hospital".

So he came in and the first examination was the gallbladder. They gave him an enema the night before, two enemas in the morning, and then he appeared for his gallbladder. The next examination was a barium enema and he got two ounces of castor oil, and an enema in the morning. Then the next night they were a little more gentle and gave him milk of magnesia to get rid of whatever might be left in the colon, and an enema in the morning, and when I went in to see him the fourth day, he was in agony. He had a thrombosed hemorrhoid. We put him in a sitz bath and told him there was nothing wrong with him, and sent him home.

Forty-eight hours later we had to readmit him and operate on his hemorrhoid.

Dr. Lermann:—Thank you, Dr. Weintraub. There are more ways than one of getting into trouble. I think the feeling is that castor oil is one of the few laxatives which follows the outline of the bowel. So many of them will bore a hole through the center and leave a great deal of material clinging to the bowel wall.

Dr. Bancroft, would you like to comment?

Dr. Bancroft:—I agree with using castor oil and not with using enemas.

Dr. Martin:—I have no comments to make on the time needed for intestinal tranquility to be restored after administration of castor oil, but a sentence that Dr. Weintraub spoke interested me. A patient came to him and asked for a roentgenological examination, a favor to which he acquiesced. Now, there is no reason in the world why a roentgenologist should not undertake a roentgenological examination. They are doctors with licenses to practice medicine, and there is

no gainsaying this fact. The appropriateness of it is my query and I wonder if that is the better way to approach the subject?

The more I see of medicine, the more I realize that unless a clinician holds the reins, the horse gets out of line.

Dr. Lermann:—Thank you, Dr. Martin.

The next question brings us into therapy.

Dr. Weintraub, in what diseases of the gastrointestinal tract do you consider roentgenological therapy of value?

Dr. Weintraub:—Our experience with treatment of ulcer with x-ray therapy has been extremely limited. I have nothing to do personally with the radiotherapy department. It is a different department, but I made inquiries today and I found that we have treated only about eight cases with a 50 per cent good result, and those cases were selected very carefully. They were mostly elderly individuals with chronic ulcer, with persistent symptoms, who had other diseases. They were too ill to be operated upon or, in a few cases, they refused operation.

Of course, we know that Dr. Walter Palmer is enthusiastic about the treatment of ulcer with x-ray, but I don't think his results have been very much better; that is, a 50 per cent recurrence of symptoms.

The other field, of course, is the lymphoblastomas of the gastrointestinal tract, but in those cases we have to work very closely with the surgeons. Wherever possible, I think the major part of the disease should be removed surgically and then treatment should be supplemented. Sometimes the results are excellent. I have one case which was operated upon in 1934, for an extensive lymphosarcoma of the jejunum. Dr. Heuer resected 14 inches and did a side-to-side anastomosis. There were numerous metastatic nodes in the mesentery. The patient received two courses of x-ray therapy and he is alive and well today.

Dr. Bancroft:—I should like to report the following case history to show how sometimes the radiologist leads surgeons into the wrong path:

This patient was admitted to the Veterans Hospital with a history of partial intestinal obstruction for about seven days. Scout films showed some large intestinal dilatation as well as signs of ileus in the small intestines. The radiologist convinced the resident surgeon that this was probably a low colonic lesion causing obstruction and at his insistence, the resident performed a cecostomy. The small intestinal ileus was overlooked. On reviewing the films at a surgical conference later, we felt certain that the patient had an ileus duplex and that unless his small intestines were decompressed, the outcome might be serious. Therefore, a Miller-Abbott tube was inserted. At operation five days later, it was found that the patient had an appendiceal abscess involving his terminal ileum. The pathology was not a malignancy in the colon but a suppurative appendix located under the ileocecal valve.

Dr. Martin:—I think that the first seaker, Dr. Weintraub, has inferred that he is not in favor of x-ray therapy in gastrointestinal conditions and he made the exclusion of lymphosarcoma. I think our experience is exactly the same as that. We have, or at least I have, seen only one case of lymphosarcoma that was recognized in time to operate on it and treat it. That patient has done very well. I have forgotten how widespread was his treatment. I do not know whether it was general, or covering only the location of the original tumor.

The use of roentgen-ray exposures in the treatment of peptic ulcers is, I suppose, reasonable in the face of circumstances such as have just been mentioned, but in older people I would think that it was a rather dangerous thing to do except under very limited conditions. The gastric ulcers of older people (and I am speaking of gastric ulcers) are dangerous things and almost always need surgical therapy. The amount of treatment that one would administer to induce a recession of hydrochloric acid wouldn't do anything to the base of the ulcer which was cancerous. Its consideration is fraught with danger and would induce me to use a great deal of caution, as I know is the case in Dr. Weintraub's hospital.

Dr. Lermann:—Our last question has already been answered, which is the one about duodenal ulcer and therapy, so I think that we might have a discussion at this time of the various questions that have been asked. I think that I should like to hear from anyone who wishes to discuss this.

Dr. Franz J. Lust (New York, N. Y.):—I should like to discuss the question asked by Dr. Lermann and answered by Dr. Weintraub. As to the value of the twenty-four hour film: I think we all agree that this film can be discarded. This examination is only necessary in cases of very definite obstruction of the pylorus.

As to the question of the six hour film: I do not think that we should discard this film at all, as we consider it of the greatest diagnostic value, whether or not we give the ice water, which is widely used. We frequently find that a stomach starts to empty during the first hour, just as if its function were perfectly normal, but to our surprise, we see, in quite a number of cases, that there is a definite six hour gastric residue.

Dr. Martin said he does not know what the correct emptying time of the normal stomach is. He is perfectly right. We have studied many children, and we were highly astonished to find a delayed emptying stomach in many apparently normal cases. Organically, these stomachs were normal, with normal function during the first two hours, however, later on they reveal the symptoms of a six hour retention. These stomachs are not adequate to the digestive process. I have called them "the easily tired stomachs".

We have discussed the question of procedure of the roentgenological examination. I am talking now about the procedure in the doctor's office, as compared with that at the hospital. I suggest that the gastrointestinal examination should include one film of the lower third of the esophagus. The highest percentage of

esophageal pathology is found in its lower third. For that reason, in each gastrointestinal series, as I showed two years ago in Boston, I include one film in the right oblique position, with a filling of the esophagus. This is especially important as we see fewer and fewer ulcers of the lesser curvature, but a large number close to the cardia and lower esophagus.

As to the question of the barium enema: it is a difficult examination and, as Dr. Weintraub told us, our friends in Texas have a special procedure. The important thing is that we see and especially examine the right lower quadrant. Compression and spot films are useful in detecting the abnormal outline and fixation of the chronically ill appendix. The retrocecal appendix is very often hidden by the cecum, its visualization is often extremely difficult. The malrotation of the cecum is much more frequent than generally found. The resulting subhepatic position of the appendix is of great clinical significance.

In the preparation for the barium enema we all have the same difficulty, especially if we examine patients in the hospital. I have found in those cases that the preparation is poorer than that of those patients coming to the doctor's office. I have given up the recommended procedure of preparing the patient with castor oil, in fact, I gave it up about twelve years ago, when the French school did a thorough study of the different cathartics and their effect on the mucosa of the colon. They found that castor oil denudes the surface of the colon of its mucus, so that the outline of its folds is impaired after evacuation. The best preparation that I have found is the soap-sud enema, taken in the morning, followed by a light breakfast. The administration of an enema seems to be one of the most difficult procedures for nurses. Generally they are given by the student nurses. They hold the cans high, with the result that the patient gets cramps and is able to retain only a pint of water, and rushes to the bathroom. Of course, then the patients are poorly prepared. Very important is the time interval between the cleansing and the barium enema. Long studies have shown that after a soap-sud enema had a so-called good effect, some of the water is still retained in the intestine for about one or two hours. Afterwards, the water is reabsorbed in the system. For this reason, it is our routine to have a cleansing enema given three hours before the examination, in order to allow sufficient time for the absorption of the surplus water. By this procedure, we avoid the hazy outline, which we see ever so often on colon films. We take films (1) after full filling of the colon by contrast enema, (2) after evacuation, and, (3) after air insufflation.

One of the pitfalls in colon examinations are round filling defects. Not every one of them is a polyp or a carcinoma. In such instances the examination should be repeated, for hard fecal matter may give the roentgenological appearance of a tumor.

Concerning the roentgenological examination of the pancreas, we all know that we are only at the beginning. New substances have to be found to outline

the organ. However, I like to draw your attention to a report in the French literature, relating and demonstrating the outline of the duct of Wirsung. In a case of carcinoma of the pancreas, the duct showed impressive abnormalities.

Dr. Lermann:—Thank you, Dr. Lust.

A question has been handed in: Of what value as a diagnostic aid is the use of pneumoperitoneum and pneumoretroperitoneum in the study of gastrointestinal biliary and spleen disorders?

Does anybody else wish to discuss these questions?

Dr. Hyman I. Goldstein (Camden, N. J.):—I want to make one minor correction. My youthful friend, Dr. Bancroft, wanted to know what Weintraub meant by a "*decubital position*", and he was wrongly informed, inadvertently! The term "decubital" in itself has reference to ordinarily lying on the bed—but usually we should prefix it with the word "*dorsal*", when on the back, and when on the side, it should be "*lateral decubitus*".

Dr. Lermann:—Thank you, doctor, for the technical discussion.

Dr. Bassler, would you like to discuss this question?

Dr. Anthony Bassler (New York, N. Y.):—I should like to say that the one great requirement for an x-ray examination is the presence of a fully trained roentgenologist. That sounds silly, but when patients come in with x-ray reports, and no films, (and sometimes one has difficulty getting films released either because they are held in the office of some private doctor, or even in institutions) it is delaying, to say the least. Very often in smaller hospitals, the x-ray work is done by technicians, and an x-ray man or a roentgenologist may not appear, some times for a day or so to interpret the films.

Now, I feel that a real requirement for an x-ray examination that is satisfactory should be that it be done by a fully trained man and the patient fluoroscoped and films made in an excellent place. This could be accepted by us if it is done under excellent conditions and not too long ago. Usually the best hospitals will release films to you on request, but the man who has charge of this patient should see the films with the roentgenologist, whether he has to go to the office of the roentgenologist, or whether he goes to the hospital. The hospital should have definite times when these roentgenologists are there, because, in my opinion, there are so many pitfalls, so many errors are made, by the doctor being careless in accepting a report. In other words, I am making a plea for institutions having roentgenologists there all the time, and that in every examination that is made on your patient, a roentgenologist should be present to help you interpret the films.

Dr. Lermann:—Thank you, Dr. Bassler.

Does anybody else wish to discuss these questions? If not, I think we will ask Dr. Weintraub to reply to questions that have been handed in.

Dr. Weintraub:—Dr. Goldstein has asked about the use of pneumoperitoneum. We are using this procedure more and more, recently, and it does supply valuable information, particularly to the retroperitoneal structures, the kidneys, the outlining of the adrenal glands. Also, it is being used by one of our men as treatment for hiatus hernia—Dr. Maisel—and he claims very good results.

Dr. Martin:—Retroperitoneal?

Dr. Weintraub:—Intraperitoneal. If sufficient air is introduced, most of the organs are displaced downward. Dr. Maisel has been using it as a method of treatment for reducing hiatus herniae. He insufflates every three or four days in the beginning, later, once in seven to ten days. I do not know how long the treatment continues. It seems to me to be a rather heroic treatment for hiatus hernia. What do you think Dr. Bancroft?

Dr. Bancroft:—I should like to know what the late follow-ups are.

Dr. Weintraub:—I think it is a diagnostic procedure and as such, both the peritoneal insufflation and retroperitoneal insufflation are of value.

I wish to correct Dr. Martin's opinion of myself. I am not primarily a roentgenologist but a clinician. For 25 years, I practiced gastroenterology. At present, I am connected with the Department of Radiology of New York Hospital, in charge of gastrointestinal radiology. My thinking and approach to the patient is that of a clinician. I still know how to use a stethescope and palpate a belly.

The problem of obtaining emergency films and interpretations in a small hospital is a difficult one. It is my belief that the radiologist should be subject to emergency calls as well as the other members of the staff. In the larger hospitals, the x-ray resident staff is always available.

The question of hiatus hernia is an important one. The demand for its demonstration has increased considerably in the last 5 years. Every patient should be examined routinely in the Trendelenburg position and with the Valsalva maneuver. In my experience, however, this method does not demonstrate as many herniae as the following procedure: Place the patient in the prone, right oblique position and give him a tablespoonful of barium paste, then spot the lower end of the esophagus. One must be careful not to confuse a phrenic ampulla with a hiatus hernia.

Dr. Martin's question as to the effect of the large quantity of iced saline on the stomach is an interesting one. According to our observations, the stomach appears increased in size but the peristalsis are either absent or very feeble. The cold liquid acts on the phyloric valve, permitting it to remain wide open and the liquid flows through without the aid of peristaltic activity. This phenomenon was noted by Gershon-Cohen and his co-workers in 1940, that is, that hot liquids close the pylorus and cold opens it. Very few patients object to the taking

of the saline and most prefer the slight salty taste of the barium mixture to the sweetened mixtures.

I wish I could answer the question concerning x-ray therapy of regional enteritis and ulcerative colitis. We haven't used this type of therapy for these conditions at the New York Hospital.

Dr. Lust's remarks are very pertinent and I have great respect for his opinions. Perhaps, we should do a six-hour examination but it would not be feasible at our hospital where we average 30 gastrointestinal series a morning. We are partial to the one hour film and can judge delayed emptying fairly accurately. Also in over half the cases, the small bowel is well visualized. The six-hour film is of value in cases of ileocecal tuberculosis and other inflammatory lesions of the cecum.

For the barium enemas, we add a tablespoonful of powdered tannic acid. This results in a better mucosal pattern. It is also important not to disturb the colon too much. Use the minimum amount of barium mixture.

It is essential for the radiologist to cooperate with the gastroenterologist, particularly in the follow-up of ulcer patients. Every time that such a patient develops a recurrence of symptoms, one should not assume that it is due to the activation of the old ulcer. He may have developed a new ulcer or an ulcerating carcinoma. A re-examination is always indicated and the radiologist can do this simply and inexpensively. A few swallows of barium and a few spot films is all that is necessary.

I think this answers most of the questions. I wish to thank the committee and the audience for their kind reception of my remarks.

Dr. Lermann:—Thank you, Dr. Weintraub.

Dr. Bancroft, in closing have you some remarks to make?

Dr. Bancroft:—No.

Dr. Lermann:—None at all?

Dr. Martin, do you have any closing remarks?

Dr. Martin:—I am in the same boat with Dr. Weintraub. I utilize the resources or the aids of psychiatry. A number of my friends and colleagues do the same. Heaven knows we are not ranked as psychologists, nor would we be admitted to an organization dedicated to the furthering of study in that subject, but we do good to many patients, and I know that Dr. Weintraub does good. I withdraw my remarks to him specifically.

I have been asked to discuss the significance of pylorospasm. Before discussing the functional element of pylorospasm, it is necessary that we all remember the anatomical setting of the pylorus and the stomach. Within the stomach are

the plexi of Auerbach and Meissner, which are probably stimulated by the sympathetic nervous system. It is not known whether there is any direct connection with the plexus of Auerbach and Meissner. It is not known whether the plexi of Auerbach and Meissner have an autogenous activity. The innervation of the pylorus is a study yet to be completely finished. There is no definite study of this portion of the stomach.

The general consensus has been that the vagus contracts it; the sympathetic dilates it. I question very much whether the sympathetic dilates anything in the stomach except blood vessels, and also in the intestinal tract, or whether it constricts or has any motor action except on blood vessels. It may be that the ice water reaction that has been described is due to constriction of the small arterioles causing lack of blood supply and thus atonicity. In this way there could be a rapid flow through the gut. Now, of course, I don't know whether that is true or not, but I am just wondering.

The pylorus receives stimuli through the autonomic nervous system which is influenced by the central nervous system. The reactions resulting from one's environment are relayed to the viscera via the sympathetic and parasympathetic branches and may reach the stomach and pylorus. The conditions which are relayed to the hypothalamic and higher centers are also reflected to the stomach and pylorus. Consequently, the presence of a pylorospasm may be the result of maladaptation to the work, or people, or environment, or it may be a sign of protest in a body against some illness that is within the body. It may be the result of gallbladder disease. It may be the result of a headache; it may be the result of an inflammatory reaction in the lower extremity. It is again the physician's difficult lot to determine what is the cause of the pylorospasm. If he is sure that it is functional, as a result of maladaptation to the environment, he has one way of treating it. If he thinks it is a result of a disease within the body, he has to proceed accordingly. For this reason, I think that the six-hour film may be of value and it is used considerably in our hands.

Dr. Lermann:—Thank you, Dr. Martin.

It would seem to me that there are a few basic findings here this afternoon which we might all remember. First, gastrointestinal x-ray examination is expensive; therefore we should do only what is really needed; secondly, when a surgeon or an internist has a problem, instead of sending patients "cold", as it were, to the roentgenological department, he should hold a consultation with the roentgenologist, telling what the findings are, what he suspects, and leave it up to the roentgenologist to determine the proper method of roentgenological approach to those findings. Third, the problem is settled that there are ways of shortening a roentgenological examination today. I presume more and more of them will turn up as time goes on, but it is nice to know that one can give barium with normal saline and have one's stomach and entire small bowel studied within the hour. I think, perhaps, as I recall, the saline will go through the colon much more

rapidly, so perhaps before we are through, one day may satisfy the question; in other words, it is still all influenced by the economics of the question. It is time-consuming, the volume seems to be great, and getting greater all the time.

I suppose the time cannot be far away when there will just have to be enlargements of all roentgenological departments, equipment as well as personnel.

The one thought on which I was raised, and to which I always come back is—I was always taught—and Dr. Thomas McCrea was my professor of medicine—to treat the patient and not the disease alone. I think that might hold true as far as the roentgenological examination is concerned. If the roentgenologist knows the problem, then he is in position to take that patient as an individual, instead of everybody just getting a one level examination regardless of symptoms or previous findings. I think we have to enlist his aid a little more than we have done, and let him know what is bothering us, and let him decide what type of examination to give the patient.

Personally, I want to thank Dr. Weintraub, Dr. Bancroft, and Dr. Martin for appearing here today. We have all enjoyed it and I think we need more discussions of this type.

SOME ORAL LESIONS OF GASTROENTEROLOGICAL INTEREST*

ADOLPH BERGER, D.D.S., F.A.C.D.†
New York, N. Y.

The oral region consummately considered is of interest to students of biology and to all who practice any phase of medicine, surgery and dentistry. The oral cavity is of special interest, however, to the gastroenterologist and the internist being the gateway to the alimentary canal. In a larger sense this region could be well considered a biological unit because the several constituent parts serve the body economy in various functions and capacities. Because of the diversity of functions which take place here, the region offers a fertile field for anatomic, physiologic, pathologic and therapeutic considerations.

It is not within the scope of this presentation to discuss the processes of digestion. It is nevertheless, well to recall that some important phases of nutrition, the preparation of food for digestion and final assimilation takes place in the oral cavity.

This function may be divided into two parts; i.e. physical and partial digestion. The physical consists of dividing the food substances by mastication into smaller particles to render them more readily accessible to the digestive juices in the mouth and in other parts of the alimentary canal.

The importance of these functions was long recognized by diagnosticians. Nevertheless, it is frequently only obscurely considered. To quote Williams[1], "One of the most common causes of aberrant dyspepsias is the one most commonly overlooked. I mean dental caries." To quote further, "Patients are suspected to be suffering from cancer, gastric ulcer, esophageal strictures, hepatic, pancreatic and even splenic disease, when a few visits to a competent dentist will cause the disappearance of all their symptoms. I believe it to be true that the dentist cures more cases of indigestion than the physician." It must be assumed that Dr. Williams alluded to the functional disabilities resulting from dental caries and otherwise diseased teeth.

Gould[2] states, "A sense of fullness after a meal which may amount to pain, flatulence, and chronic constipation may be due to the want of molar teeth. If, when this want is supplied, the symptoms disappear, the diagnosis is established."

Besides the above, there are other conditions responsible for impaired mastication. Disabilities of the temporo-mandibular joints are of special interest. The diagnosis of the various disturbances of these joints requires individual study.

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†William Carr, Professor of Oral Surgery (Emeritus) School of Oral and Dental Surgery, Faculty of Medicine Columbia University.

Diagnosis

The pathology of the oral region is, in many respects unique, in that there are numerous diseases which occur only in these parts. On the other hand, numerous diseases and disturbances of the oral cavity are of systemic origin. Some such complaints and disturbances are pathognomonic. The complexity of the pertinent considerations strongly suggests that the diagnosis of oral pathological conditions, structural and functional complications, require special study reinforced with a background of experience.

Favorably, these parts are freely accessible for clinical and laboratory diagnostic measures. A thorough examination of the oral region and the oral cavity entails in some respects, more details than many other parts of the body. A regional pathological state or abnormality should be distinguished whether it is of purely local significance, whether it has a bearing upon some remote ailment and upon the general health of the patient, whether it is idiosyncratic or the local manifestation of a systemic disease. A large number of systemic diseases cause recognizable symptoms to a careful examiner of the oral cavity. Among others, mention may be made of syphilis, tuberculosis, endocrine disturbances, blood dyscrasias, obscure virus infections, malnutrition, vitamin deficiencies, drug reactions and others.

A complete oral examination comprises in general, the following procedures: (1) Inspection, (2) Palpation, (3) Olfaction, (4) Roentgenographs, (5) Serologic Examination, (6) Aspiration, and (7) Biopsy, in cases of lesions which are suspected of being or are clearly neoplastic of undetermined nature. The first four of these should be routine. The indication for the others will depend on the anemnesis, the nature of the complaint or the nature of the existing lesion.

Inspection

A casual glance into the oral cavity with the aid of only a poor flashlight and a tongue blade is of little value where a careful examination is required. Even in apparently well-kept mouths it is desirable to cleanse the teeth and the gums primarily with a cotton swab or a gauze sponge saturated with an antiseptic deodorant solution. Patients with oral complaints are naturally reluctant to cleanse their teeth. The accumulation of food particles, sordies, and mucus precipitates frequently hide or disguise lesions of importance. Such a superficial cleansing will also modify the fetid odor of a neglected mouth.

The inspection should take in the fauces, the lips, the buccal parieties, the gums, the teeth, hard and soft palate, all surfaces of the tongue, floor of the mouth, the oropharynx, and the cervical lymphatic glands. Note should be taken of ulcerations, breaks in the continuity and alterations in the texture of the mucous membrane, inflammatory processes, discolorations, distention and displacement of the tissue relationships, nodes or nodules, dental abnormalities and dental restorations.

Points of irritation whether caused by defective, jagged teeth, or by dental restorations should be noted and their elimination advised. Irritation as the causative factor in neoplastic conditions is being largely discounted. Truly, the cytologic-plus which is basic in neoplastic developments is just as enigmatic in the oral cavity as in other parts of the body. Nevertheless, a clear cut causal relationship between irritations and malignancies in the oral cavity is not uncommon. In view of the fact that the when, where and why of neoplasms is still wrapped in mystery it is a wise prophylactic measure to remove all obvious irritating factors.

Palpation

Discrete palpation is inestimable in the clinical diagnosis of the oral region. As more and more reliance is placed upon laboratory methods, it is regrettable that the art of palpation is not cultivated to its fullest advantages.

In inflammatory conditions, the nature and the pathological state of the lesion can be ascertained with the palpating finger. Pressure upon a discolored area about some teeth will frequently bring forth a pus discharge through a hidden sinus which leads into an infected bone lesion.

Palpation of the cervical lymphatic glands should be routine in the examination of the oral region. Enlarged cervical lymphatic glands are often pathognomonic as in syphilis, or tuberculosis, for instance.

It may be of interest to note that acute or chronic odontogenous pyogenic infections very rarely, if ever, cause cervical lymphadenitis. This is true even in the presence of multiple bone lesions about the root-ends of the teeth which are recognized as foci of infection. When cervical adenopathy and these lesions coexist, the cause should be sought in another source.

The more common oral infection being concomitant with adenopathy, is Vincent's Angina or Trench Mouth. Some other ailments in which oral ulcerations and enlarged lymph nodes occur are: ulcerative angina, leukopenia, or agranulocytosis and infectious mononucleosis.

Tender glands with tendencies to rapid enlargement are frequently seen in the leukemias. These ailments are usually characterized by extreme pallor, and a spiking fever; the spongy ulcerated gums show no tendencies to cicatrization. They bleed spontaneously and persistently at several points. The bleeding is not easily and is only temporarily staunched. These patients are usually despondent and the expression of their eyes seem to reflect an instinctive foreboding of doom.

Adenopathy associated with indolent soft tissue or bone lesions are usually metastatic and malignant. Other etiological causes are infections of the lips, the sinuses, the tonsils, the scalp, the exonthomata in children. In children the source of infection is not always recognized and the adenopathy is often only transitory.

Enlarged cervical lymph glands should be differentiated from an enlarged submaxillary salivary gland, from thyro-glossal and dermoid cysts and in the periauricular area, from mixed tumors of the parotid gland.

Roentgenographic Examination

No oral examination is complete without a careful roentgenographic examination. The value of this check-up will depend on the quality of the roentgenographs and their dependable interpretation. Various pathological conditions, congenital and developmental abnormalities, also benign and malignant neoplasms are often discovered by this means at an early or even at an incipient stage.

It is my considered opinion that a radiographic check-up of the teeth, their investing tissues and even the jaws should be an essential part of a complete medical record. In children, periodic examinations from the age of about seven until all of the permanent teeth have been accounted for would prove advantageous. In adults, especially those who show the ravages of dental diseases or had extensive dental repair and restorative work done, roentgenographic examinations are essential.

Infections

The two most common infections which occur in connection with the teeth and their investing tissues are pyorrhea and those associated with pulpless or devitalized teeth, generally spoken of as dental foci of infection.

Pyorrhea

Pyorrhea is a generic term which includes several types of inflammatory and degenerative processes of the gums and the investing tissues of the teeth. The type that is of interest in this connection is characterized by inflammation of the gums, detachment of their crenated edges and destruction of the alveolar bone resulting in pocket formations. At some stage, a pyogenic infection supervenes and with a slight pressure a purulent discharge may be expelled about the gum margins. The pus not being under tension, the lesion is usually painless. One or any number of teeth may be affected. The lesions are always chronic and the destructive process progresses until all the teeth bcome loose and are eventually lost. The breath in these cases is usually heavy and at times, highly offensive. In a sense the lesion may be compared with a low grade suppurative osteomyelitis as in many respects there is a close similarity between the two affections.

The amount of the discharged pus, mixed with saliva, food and drink ingested, would be difficult to estimate. Also the toxic absorption and bacterial dissemination from these ulcerative pockets should be considered. It has been

estimated that in advanced cases the ulcerative areas may be from three to four square inches in extent.

Some internists hold that the toxic absorption and bacterial dissemination from this source can be gravely deleterious to general health and digestion and may also exert a pernicious influence upon the lining of the stomach.

To quote Gould[3], "The recognition of pyorrhea is important because it may directly cause the symptoms of which the patient is complaining—pain after food, vomiting, hematemesis, constipation with anemia, wasting and debility, and also because grave abdominal lesions such as: gastric and duodenal ulcer, cholecystitis and appendicitis may be due to secondary infection from the gums. Infection, wherever found, should be vigorously dealt with and cured to remove a possible source of infection of other parts of the digestive tract, and to allow the 'spontaneous' subsidence of secondary lesions." Further, this author states that chronic indigestions and other complaints are certainly due to other causes besides pyorrhea and the lack of teeth.

Dental Foci of Infection

A second group of common dental infections which are held to have a bearing upon gastrointestinal lesions and disturbances are those recognized as dental foci of infection. The pathology of these lesions is not generally understood. Briefly, these infections are always associated with devitalized or pulpless teeth. The infection originates in a gangrenous and decomposed pulp of a tooth or in only a portion of this organic matter.

The port of entry of the organisms is by way of a carious cavity and under some circumstances through the blood stream. From the pulp canal the bacteria and their toxins pass beyond the root-end into the peridontium where they set up a low grade infection.

In a preponderant number of cases, osteolitic bone lesions result, which can be best demonstrated with roentgenographs. A large portion of such lesions begin as, and remain asymptomatic through years; some, however, pass from an acute into a subacute stage and into chronicity. In many instances such chronic infected areas become circumscribed or walled-off by defensive proliferations, the dental granuloma, which often develops into a radicular or root cyst. The immunologic effectiveness of this walling-off is questionable, however, as these lesions, upon test, always contain bacteria and when surgically exposed, a large percentage contain frank pus.

Not all lesions are thus walled-off. Some are of the nature of suppurative osteitis or bone abscesses. In these, the sticky foul-smelling pus is lodged in an eroded decalcified and broken-down cavity. The infected contents are intimately exposed to the circulation of the Haversian spaces and canals. These lesions usually have one or more fistulous openings through which the pus evacuates in

the proximity of the offending tooth or upon the external surfaces. The parulis or gum boil with its recurrent disturbing symptoms is a subperiosteal variation of the same lesion.

During the past decade the consideration of the pathogenicity of dental foci of infection has passed into almost complete desuetude. This lapse is partly due to the experience that, following their eradication, the results were not always convincing. Also, more recently an unwarranted degree of reliance is placed upon the efficacy of antibiotics to deal with all kinds of infections under all circumstances. But regardless of the agencies which are prone to lull us into a

Fig. 1—Extensive cellulitis involving both upper and lower jaw region, caused by chronically infected upper molar.

sense of complacency, it is certain that these lesions are the products of infection and that they contain pathogenic bacteria which can metastasize to remote organs or portions of the body.

My personal experiences in this regard, through the years, are in accord with the findings of such keen and dependable observers and investigators as Benjamin Rush, Frank Billings, Hunter, Mayo and a host of others. That bacteriologists have failed to duplicate the findings of Edward C. Rosenow does not invalidate his researches in the elective localization of bacteria. His methodical procedure has, to my knowledge, conformed more closely to Koch's postulates than that of any other researcher in this field.

Comparatively recent hematologic researchers have shown that transient bacteremia follows frequently upon the removal of infected teeth. This may be taken as proof that actual hematogenic dissemination of bacteria does occur from this source. Now, the trauma caused by the removal of the average infected or pyorrhetic tooth is insignificant as compared with the trauma caused by the pounding of mastication, repeated hundreds of times during a day which is transmitted through the teeth to these infected areas. True enough, the extraction wound opens up fresh channels for the entrance of bacteria. But, those apparently chronic, inactive foci are not sealed off either. This is evidenced by the experience that defectively treated, devitalized teeth and chronic lesions which have been

Fig. 2a Fig. 2b

Fig. 2a—Actinomycosis in a boy, seventeen years of age. Note the several pustules and discoloration of the intermediary tissues. The lesion originated with an infected recently filled lower first molar.

Fig. 2b—Note the temporo-facial swelling in the same patient as in Fig. 1. It extends beyond the actual suppurative areas. These swellings are non-fluctuant, and as a rule are painless.

asymptomatic through years frequently, suddenly, and unexpectedly flare-up and cause violent abscesses (Fig. 1).

It would be presumptuous for me to venture an opinion to this audience on the effects which metastasis from these infections are likely to bear upon gastrointestinal lesions and disturbances. This judgment I shall leave to your essentially more intimate experiences and knowledge.

Actinomycosis

Actinomycosis is a parasitic fungus infection caused by organisms classed as actinomices. In the human, the disease occurs in the great majority of instances,

in the oral and maxillo-facial areas. Cases have been reported, however, which occurred in the stomach, in the intestines, in the lungs, and in the liver. Robinson[4] reports a case which occurred upon the forearm of a twenty-one year old male following a human bite. The organisms are, in a sense, opportunists. This is strongly suggested by the fact that the disease was always found in association with infected teeth, bone or soft tissue lesions which contained necrotic tissue. In several cases, the infection followed upon the removal of a tooth. Some were complicated by acute abscesses with pyogenic infection. It was not possible to determine which infection was first. One case was that of an edentulous woman, sixty years of age. In her case it was assumed that the organisms were derived from the tonsils.

In the early stages and sometimes even after a lapse of time the diagnosis is not easily made even by experienced observers. The gruesome disfiguring lesions of the advanced stage are easily recognized at a glance, but clinical lesions are not always so obvious. In three cases the disease was lodged in the bone alone with no cutaneous lesions whatever. In one young woman of eighteen, the disease remained undiagnosed for several months, although she had been under observation in a recognized medical institution. She had only a small discharging fistula below the lower border of the mandible which led to a lima bean-size osteolitic cavity in the ascending ramus. The disease followed upon the removal of an impacted lower third molar.

The characteristic first cutaneous lesion usually appears as a solitary, raised pustule or node. After a lapse of time the nodes multiply (Fig. 2a). They are hard at first but later become soft and some open spontaneously and discharge their purulent contents. The discharge is sparse but fairly constant. Not in all instances does the discharge contain the pathognomonic yellowish clumps, the so-called sulphur granules.

Whether the seat of the infection is the upper or the cervico-facial area, it is important to pay attention to the associated swelling. The swelling is quite prominent, nonfluctuant, painless, board-like, at times discolored and extends considerably beyond the suppurating pustules. In some cases even the eyelids become edematous (Fig. 2b).

Positive bacteriological findings always offer a definite diagnosis. The specimen for examination is best taken from a surface-cleansed unbroken pustule with an aspirating needle. The organism must be specially cultured and stained. The fungi usually appear in the form of a typical branched mycelium and not frequently short-branched elements of bacillary forms are seen. A specimen taken from an oral bone lesion requires even greater care to avoid contamination.

Treatment

For several decades x-ray radiation and potassium iodide were the accepted treatment used successfully. The injudicious application of x-ray radiation, how-

ever, can cause irreparable damage. In the case of a boy of seventeen, radiation was followed by disastrous disfigurement. The disease was cured, but the tissues clothing the external surface of the jaw have degenerated to such extent, that only a parchment-thin skin covered the mandible and this side of the face was conspicuously flattened. Subintensive radiation is advised in these cases. If the lesion involves the orbital margins, the eye should be protected with a lead shield. Surgical interference, where deemed necessary, should consist of incising individual pustules and irrigation through the connecting passages where such exist.

The last two cases which came under my care were successfully treated with penicillin and sulfadiazene. While the two cases are too few for conclusions, this therapy commends itself because of its effectiveness and the comparative simplicity of administration. The successful use of antibiotics in other parts of the body[5,6,7] has also been reported.

Empyema of the Maxillary Sinus

Antral complications of dental and oral etiologic origin alone, will be considered in this connection. Of necessity, even these will be treated upon only in a limited measure.

It often happens that in their growth, the roots of the molar teeth and less frequently of the bicuspids, closely approximate and in some instances, penetrate the floor of the maxillary sinus, so that they are covered only by a very thin layer of bone or merely by the Schneiderean membrane.

If such teeth become diseased, infected and suppuration ensues, unless relieved by immediate treatment or the tooth is removed, the pus being under tension will most likely break through the sparse separating bone and the mucous membrane and evacuate into the sinus. The occurrence is usually followed by an acute infection of variable severity and duration which, in many but not all instances, lapses into a state of chronicity.

During the chronic stage these patients are not acutely ill but they are prone to complain of headaches, head colds, an unpleasant taste and anorexia is common. Usually, there is no fever nor other general signs of infection. Their principal complaint and cause of distress is a foul-smelling discharge of muco-pus from the nostril. The highly fetid penetrating odor is reminiscent of rotten eggs so that it is offensive not only to the patient, but also to those in their proximity. The offending odor is the source of no negligible embarrassment.

When in a recumbent position the pus passes into the nasopharynx and some of it undoubtedly trickles into the stomach. The nasal discharge is most copious in the morning when the patient has also the unpleasant task of clearing the throat and the nasal passages of the inspissated and dried pus. During waking hours the pus can be expectorated but some of it is most likely swallowed.

Whether the ingested pus has a detrimental effect upon digestion or upon the stomach is problematic. One thing is certain, the condition is not pleasant to live with.

Because of the anatomical relationship and structural condition, some of these oral openings do not close of their own accord. Food substances, especially liquids, find their way through the aperture into the sinus and, precipitating upon the floor of the cavity, break down and become a perpetuating source of infection.

Such an aperture can be covered with an appliance, but then it is still necessary to cleanse the cavity at least once in twenty-four hours with irrigation. Surgical closing with a sliding flap operation gives certain and permanent results. Closure should be preceded by the removal of all foreign substances, polypoid tissues, and non-viable parts of the lining membrane.

Chemotherapy

Chemotherapy is a proven and valuable aid in the prevention and combatting of infections in oral surgery. The prophylactic administration of antibiotics is a sound precaution in individuals who, for medical reasons, are predisposed to infection. I am inclined to believe, nevertheless, that under many conditions though not necessarily contraindicated, the administration of antibiotics could be safely omitted. Complete reliance should not be placed upon antibiotics, however, in surgical cases, for there is no substitute for clean and skillful surgery. No untoward complications are likely to develop where necessary surgical skill and cleanliness are observed.

On the other hand, the occurrence of preoperative or postoperative serious and threatening acute cellulitis and widespread infections especially in the submaxillary, sublingual, and peritonsilar areas have declined to almost the vanishing point in recent years. I am inclined to attribute this to the more general use of antibiotics.

In a large percentage of oral infections in which surgical intervention was inevitable in the past, they cleared up with antibiotic therapy. Where complete cure was not effected, the spreading of the infection was inhibited and all symptoms promptly took a favorable turn.

In the case of a child of five and a half years, with all signs of early diffuse osteomyelitis of the mandible caused by an abscessed tooth, a condition which usually leads to necrosis and sequestration, it was cleared up with the administration of penicillin without surgical intervention.

Where a sequestrum has already formed, or where the suppuration caused a massive breaking-down of tissues which are not permeated by the circulation, chemotherapy alone will not bring about a cure. Removal of the sequestrum and evacuating and drainage become necessary.

Like all good things, so antibiotics are not an unmixed blessing. Flaxman[8] reports, "Since December 1946, a total of 107 drug fatalities have been reported in the literature, with antibiotics predominating."

Oral reactions of monoliasis is of common occurrence, even with the least noxious antibiotic, penicillin. Smears taken from these lesions are usually positive for the causative fungus, *monilia albicans*. The lesions are seen upon the tongue, the palate, the cheeks, the lips, and may extend to the tonsils and pharynx. The lesional patches are adherent to the underlying mucous membrane and when removed, leave a raw bleeding surface. Upon the tongue, the normal papillae are replaced with a whitish milky curd-like tissue. In some cases the tongue becomes coated with a brown, or black coating. The discoloration usually disappears upon the discontinuance of the drug.

Monoliasis usually yields to frequent rinsing with alkaline solutions and the application of an aqueous solution of methylene blue. Vitamin B_{12} is also beneficial.

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Discussion

Dr. I. Snapper:—Dr. Berger has given us a very interesting lecture on the diseases of the mouth.

Maybe he is somewhat optimistic by stating that monilia disappears when the antibiotic is stopped. Monilia infections creep along the esophagus and trachea to invade the lungs. Nowadays, we repeatedly meet monilia granulomas of the lungs in which the yeasts were able to proliferate under the influence of the large amounts of antibiotics which were given.

We certainly have to agree with Dr. Berger that at the first sign or symptom of moniliasis, the antibiotics should be stopped.

Dr. Berger correctly stressed the danger of administering antibiotics in certain lesions of the teeth, for instance when pulpitis with a periapical abscess has developed. An abscess never heals under antibiotic therapy unless the pus is evacuated. Therefore, as soon as periapical abscesses have formed, oral surgical treatment combined with administration of an antibiotic is indicated.

Dr. Berger has emphasized that in odontic lesions, lymph node swellings at the neck are rare. On the other hand, a small somewhat tender lymph node at the inner margin of the mandible opposite the place where the masseter inserts, often indicates an inflammation of one of the roots of the teeth. This, in its turn, may lead to the discovery of the cause of fever of unknown origin, or iritis, or scleritis. Although focal infection originating from the mouth has gone into discredit, nevertheless, fever of dental origin and infection of dental origin are still encountered occasionally.

Dr. Berger has correctly emphasized the importance of what is sometimes loosely called pyorrhea. Presence of pus in the socket, easily expressed by pressure, is often due to atrophy of the bone of the jaw. In these cases the tooth neck gradually becomes exposed, followed by inflammation of the tooth socket. This secondary inflammation due to atrophy of the tooth socket is frequent, and is, as Dr. Berger has so clearly explained, a frequent cause for stomach complaints and poor digestion.

Many dentists have used the extraction of all the teeth as a short cut to the treatment of this disease. This, of course, is also of importance for the digestion. If one offers a succulent steak to a dinner guest and he politely prefers chicken à la king, then one knows he wears dentures. Although dentures often improve the condition of the patient, they nevertheless limit the denture bearer in the selection of his food. Therefore, loose teeth surrounded with pus should, if possible, be cured and not extracted immediately.

The most frequent causes for atrophy of the jaw, leading to exposure of the roots and to secondary infection of the sockets, are hypoestrinism and postmenopausal osteoporosis. One of the very first bones which becomes osteoporotic in conditions in which not enough estrogenic substance is excreted is the jaw. In hypoestrinism good x-rays demonstrate the atrophy of the bone of the jaws, whereas the dental lamina dura remains intact. In such cases the osteoporosis and thereby the pseudopyorrhea often can be improved by administration of estrogens or of testosterone propionate.

Dr. O. H. Wangensteen:—Dr. Berger's paper was very interesting. I am reminded of the discussions which took place before I was a medical student, emanating primarily from Frank Billings, at Chicago, who propounded the thesis of focal infection of which, as Dr. Snapper suggested, we have heard very little in the intervening years.

Some of you may recall Dr. W. W. Duke, at Kansas City, who even bettered Dr. Billing's ideas about focal infection, and Dr. Berger alluded to the work of Dr. Rosenow, a delightful man who now lives in retirement. His observation of the specificity of infection and the recital of his experiment with a cat which he injected with the organisms which came from a patient dying of so-called acute pancreatitis, was interesting. Not only did the cat die of pancreatitis, but she was pregnant too and all the kittens in the litter had pancreatitis too!—a circum-

stance which puts a little stretch on our credulity (Surg. Gynec. & Obst. 33:19, 1921).

I agree with Dr. Snapper, we certainly should question seriously the suggestion that focal infection is responsible for many gastroenterological infections. Certainly there is no specific infection of the appendix, as Ludwig Aschoff once spoke of it. Appendicitis is due to obstruction of the lumen of the appendix.

I don't know how you practicing physicians look upon the item of dead teeth, and Dr. Berger's experience on this score would probably be worth more than that of any of us. Yet, as an individual, I must say that I have found it necessary to protect myself from my dentist who insisted over a period of years these dead teeth should be extracted. The only way I found to defend my point of view was to find another dentist.

I have one patient who could be used as a background for this whole discussion. She could command the full time of any one of us, and the wise discussion of Dr. Snapper, alluding to the psychiatric aspect of the thing, can't be thrown out of such discussion. I remember last year, or the year before someone in the audience suggested that in canker sores, glossitis of the tongue, and so forth, he gave nicotinic acid or riboflavin, and the lesions disappeared. I went home and absorbed that bit of learning, but it didn't do my patient any good.

During the past year, interestingly enough, she developed the largest papillomatosis on the buccal lining of her cheek, the largest I have ever seen. I thought surely it was cancer. I excised it all. It was just a papilloma. I think I will go home and suggest she take some estrogen.

I should like to re-echo what Dr. Snapper said about antibiotics, especially aureomycin. I have myself seen cases of *monilia albicans* blood stream infection following prolonged administration of aureomycin. Sometimes we do overdo the administration of antibiotics to get rid of pyogenic pus producing organisms.

There are several things which have not been touched upon, such as calculus of the submaxillary duct, and I think that a common complaint of such patients is a swelling beneath the jaw. You can put your finger in the patient's mouth and feel the calculus in the duct beneath the tongue. Sometimes one can excise the calculus and get rid of it. We have found it necessary occasionally to excise the submaxillary gland involved.

Dr. Berger:—Before all I wish to thank Dr. Snapper and Dr. Wangensteen for their gracious contribution to my presentation. It was in a sense revealing to note that as medical men they are so well informed about dental and oral conditions.

The question was asked: What are the local causes of oral fetid odor?

I believe that the most common local causes of *fetor ex ore* are the following:

There are few things that are more ill-smelling than decaying and broken-down diseased teeth. The second most common offenders are chronic suppurative processes such as pyorrhea and suppurative osteitis or bone abscesses associated with diseased teeth; decomposing food particles which adhere to the tooth surfaces, or become wedged between the teeth or are retained in carious cavities. Some types of dental restorations which do not permit thorough cleansing, or are not cleanly kept, are frequently malodorous. Diseased tonsils are frequent and grave offenders. The coated tongue often associated with gastric disturbances, ulcerative conditions of the oral mucosa and neoplasms should also be considered. A diseased maxillary sinus is usually highly objectionable to the host and even to those in their proximity. Pungent vegetables as onions, garlic, chives and some condiments leave their malodorous traces as adherent particles or by being absorbed by the soft tissues.

Tobacco is a common and not a negligible offender. One can sometimes distinguish between the odor of pipe, cigar, and cigarette smokers.

Excessive drinkers usually have a characteristic offensive mouth odor. Furthermore, some individuals are afflicted with individual mouth odors analagous to body odor.

Besides the above, local, oral and regional conditions there are organic, metabolic, constitutional, and infectious or contagious conditions which are responsible for recognizable offensive oral odors, which are, I am sure, well known to you.

Dr. Cunha:—We have one more question: Do septic teeth cause gastric hemorrhages? Do septic teeth cause chronic gastritis?

Dr. Berger:—I regret that I cannot answer this question with authority on the basis of my personal experience. Patients are usually referred to us for specific ministration. Unfortunately, they have no occasion to return with the termination of our services, and therefore, not having the opportunity to follow-up these cases, excepting in few instances, we cannot state to what extent our ministration was helpful to these patients.

ROENTGEN DIAGNOSIS IN ESOPHAGEAL DISEASES*

ARTHUR J. BENDICK, M.D.†

New York, N. Y.

I am very thankful for this occasion to come to you and tell you about what we are doing in diseases of the esophagus. I am a little sorry that we have nothing very radical to offer. I cannot show you anything that you probably are not familiar with, but I understand that this is somewhat of a refresher course, and our technics in the last few years have changed very materially in our roentgen examination of the esophagus, so I should like to stress the technic and show you some of the slides illustrating early diagnosis of lesions in the esophagus.

I have no desire to show you the large carcinomas of the esophagus which any second-year medical student can pick up. The trick is to find these lesions early, before they give any clinical symptoms whatsoever, and a technic that is able to demonstrate these lesions at a very early stage.

Formerly, we would always stand the patient up, give him a glass of thick barium to drink, and while he was drinking we would take two or three films, usually in the oblique positions and study them. In my opinion that method is practically obsolete. You cannot pick up early lesions with that technic. The mucosal work is imperative for this type examination and it is essential to have a good tilt-table equipped with a good spot device and an x-ray machine of at least 200 milliamperes capacity. You cannot do good gastroenterological work with small machines. The exposure is too long. You cannot take them fast enough, and a spot device is necessary so you can control exactly the position in which you want to examine the patient, and take films at the time you want to take them. You do not have much time; you cannot go and get films, put them in place, set your machine and make the exposure. Everything must be set, and when the barium is at the place you want it, and the patient is in the right position, then you can take your spot film.

If you use a technic like that, you will be surprised not only at how often you can see small malignancies and differentiate the malignant from the benign, and pick up your foreign bodies, but also varices and many other lesions.

The large carcinomas I am not going to discuss at all. Those are surgical problems. Any technic will show them. The patient almost makes the diagnosis himself. You hardly need an x-ray.

Now what is our procedure today? I think we should use exclusively a mucosal mixture. A mucosal mixture is nothing but barium mixed with warm

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†Director of Radiology, Beth Israel Hospital, Associate Consultant Radiologist, Mt. Sinai Hospital.

water, stirred to the consistency of cream. It must not heap up on the spoon. If it does, it is too heavy. If it is too thin, it flows too quickly and does not coat, and I would say that one of the most important parts of this type of work is the consistency of the mixture. I do not think an electric mixer is good. First of all, you are too likely to get air bubbles in the mixture with an electric mixer which makes it frothy. Good old-fashioned elbowing until you have a perfect consistency of a nice, smooth batter, done by hand, is the right mixture to use.

I remember many years ago I visited Dr. Schatski in Boston, who was just starting this work in this country, and he said his greatest difficulty was in getting the technicians to make the right consistency, because without it, the efficacy of the method dropped considerably.

Now, you have 2 or 3 ounces of this mucosal mixture. What do you do? The patient is put on the tilt-table in a recumbent position. I take very few of my films

Fig. 1

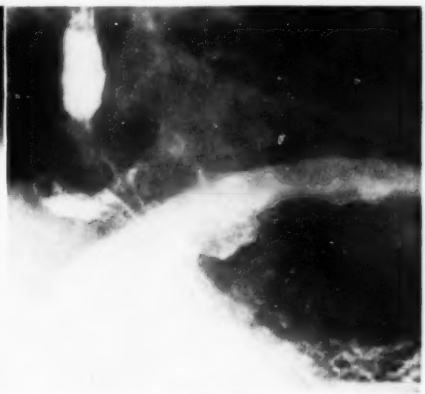

Fig. 2

Fig. 1—Club soda technic, demonstrating insertion of esophagus into stomach.
Fig. 2—Club soda technic, demonstrating small gastric hernia due to a short esophagus.

in the erect position. He is given one teaspoonful of the mucosal mixture when you are ready to fluoroscope and have him in position. He is then given a second teaspoonful to hold in his mouth. That second teaspoonful must be swallowed by the patient under fluoroscopic control. The first spoonful will coat the esophagus to a fairly good extent, allowing you to get the correct obliquity of the patient, to free the esophagus from the spine, to get it in the exact position that you desire. You may take a spot film then before he swallows, if you have a good mucosal coating. If not, you tell the patient to swallow. It is almost worthless to take the film as the patient swallows. You have to wait until the bolus has passed and you get the mucosal tracing and not the barium-filled esophagus. The barium-filled esophagus hides the early lesions. What you want is the mucosal tracing of the folds of the esophagus.

Now, what is the procedure? You usually are controlling it with the fluoroscope. The most important part of course, is the lower third. My films are 6½″ x 8½″. I take one film of the upper esophagus and one of the lower. The technic for the lower is as follows: The patient takes a deep breath and holds it, then a film is taken in full inspiration.

About fifteen years ago I was asked to discuss a paper on the gastric hernia due to a short esophagus and could not locate a single case. During the past few years this lesion is becoming so common that we are now going to the opposite extreme of diagnosing unimportant small gastric herniae due to the short esophagus and are attributing symptoms to the hernia which are due to other causes. There is not a week when I do not demonstrate perhaps a half a

Fig. 3

Fig. 4

Fig. 3—Leiomyoma of esophagus, proven by operation. Patient well today.
Fig. 4—Leiomyoma of esophagus, proven by operation.

dozen small gastric herniae and the experience of others has been the same. These are so common that they are almost within physiological variation of the esophagus. There is no question that formerly we missed many large herniae and they were being diagnosed as coronary disease, but I think we are now swinging the other way and attributing symptoms to small herniae due to the short esophagus which are asymptomatic.

If the hernia is about the size of a plum, the mucosa within the hernia is smooth, it drains freely and the minute the patient is erect, it reduces itself. I believe those herniae are unimportant. If the hernial sac is perhaps the size of a lemon, if the mucosa within the pouch shows some hypertrophy, then it becomes important. The patient may still have a coronary, but the differentiation is med-

ical and not roentgen. Do not conclude that because the patient has a small hernia that it is giving symptoms.

There are other lesions in the esophagus which we can detect very well with the barium mucosal mixture we mentioned previously. Very often they want to know if a patient has esophageal or gastric varices. The patient complains of some bleeding from the mouth or may vomit blood. They also want to demonstrate varices as an indication of liver pathology, and varices can be demon-

Fig. 5—Early carcinoma of esophagus; operated upon. Patient is alive and well fifteen years later.

strated very nicely if you use the proper technic. Do not fill the esophagus. Use the mucosal technic, examining only the lower portion of the esophagus. The patient swallows; you let the bolus go through; tell the patient to take a deep breath and then tell him to strain as though he were having a defecation and as he is straining, at the end of a full inspiration, you snap your film. It can be done only with the spot device and you cannot do it satisfactorily with the patient erect. It has helped very often in making a diagnosis of portal disease.

Another use of the esophageal studies, of course, is its displacement. Every heart man, I think, would be handicapped if he did not use the position of the esophagus to help him in the diagnosis of cardiac disease to determine various cardiac chamber enlargements.

We often find in tuberculosis that the esophagus is markedly distorted and the symptoms are due to nothing but the fibrosis of the tuberculosis displacing the esophagus.

The esophagus is also affected by some of the general systemic diseases such as scleroderma, and I will show you a few slides of scleroderma, showing the characteristic, or fairly characteristic picture of the disease. Cardiospasm is important because it is now subject to operation and the type of dilatation and the type of operation can largely be decided by a proper roentgen study.

Many years ago I devised a club soda technic which consists simply of making mucosal studies first, and then giving the patient a small bottle of club soda which he drinks, and he is instructed not to belch. This technic is valuable for gastric studies, but it has very limited use in esophageal studies. It is of use, however, in studying gastric herniae due to the short esophagus as well as in neoplasms situated in the region of the cardia and it is desirable to demonstrate the relationship of the fundus of the stomach to the neoplasm and the orifice of the esophagus can accurately be shown. Also in cases of ulcers, the small ulcers, low, just above the cardia can be very well demonstrated with this technic. We have found quite often in connection with herniae, especially as the patient gets older, that the esophagus keeps on contracting and the hernia gets larger. Though it is congenital, the patient has no symptoms until he gets well along in his fifties or sixties.

I think that now, having explained the technic, it would be well for me to go on to the slides and show you some of the things of which I have spoken. I think the slides will demonstrate these diseases much better than anything I can say.

About twenty-five slides were presented and five of the most typical cases are shown in the illustrations.

Discussion

Dr. O. H. Wangensteen:—There is one point in Dr. Bendick's discussion upon which he did not amplify, but which, I am certain, is quite obvious to you if you looked at his films carefully. That was the presence of evidences of tonus in most of these obstructions; in other words, only the atonic esophagus really dilates and the only greatly dilated esophagi, we see, are those observed in cases of megaesophagus, badly named cardiospasm, a disease which I like to call esophageal dystonia. This designation implies two elements; namely, hypertonus of the terminal segment, and atony of more proximally located segments.

In operating for paraesophageal hernia, I use the sternotomy incision. It affords ready access to the attic of the abdomen, such as no abdominal incision will do.

It is interesting to observe the crura of the diaphragm at operation for paraesophageal hernia. The left crus of the diaphragm is a powerful structure, and if you put your finger on it during respiration, it is extraordinary how it contracts and pulls away from the esophagus. By contrast, the right crus is a weak structure. This imbalance in strength of the crura is, probably in some measure if not in large measure, responsible for the development of so-called paraesophageal hernia, which always lies to the left of the esophagus. Operative closure with employment of the sternotomy incision is very simple.

I believe one can say that repair of paraesophageal hernia is simpler in principle than is the repair of inguinal hernia. One merely sutures the crura together with a few two-0 silk sutures. The edges of the diaphragm adjacent to the esophagus are anchored to it with a few five-0 silk sutures.

I want to emphasize the contraction of the left crus of the diaphragm in the genesis of paraesophageal hernia. It, together with the item of increased intraabdominal pressure, is probably the important consideration in the genesis of paraesophageal hernia.

The essayist alluded to the occurrence of the so-called phrenic ampulla which is to be distinguished from true paraesophageal hernia. The differentiation between a phrenic ampulla, paraesophageal hernia, and a diverticulum of the lower end of the esophagus, may constitute a difficult roentgenologic problem, which would demand the careful technic which Dr. Bendick demonstrated in his films.

I should like to say a few words about operation for esophageal dystonia (cardiospasm). As Dr. Bendick has said, the esophagus usually remains dilated after the conventional Heller operation (extramucosal cardioplasty). We know from the experience of Franklin and Barrett at St. Thomas' Hospital in London, that the Wendel operation is no good, in that it invites esophagitis. I myself have had a limited experience with the Heller procedure—an experience which bears out Dr. Bendick's statement that, the esophagus remains dilated roentgenographically, even though the patient is symptomatically relieved.

Recently, I employed the Heller operation for a patient with moderate megaesophagus from esophageal dystonia. The rupture of the last fibres of the circular muscle in the incisional extramucosal slit in the esophagus, however, was effected with a Bardex catheter, with inflation of the balloon. This catheter was inserted through a high gastrostomy incision. Tearing of the residual muscle fibres on inflation of the balloon could be readily observed. This patient had lost 50 pounds prior to operation. Within a short time after operation, x-ray

films showed return of the esophagus to normal size, and the patient swallowed normally.

The ordinary Heller operation done with a knife is probably incomplete. It is effective symptomatically, but the esophagus remains dilated. I am anxious as you may well believe to note whether a similar result will be observed after a Heller myotomy, carried out in this manner on a patient with a huge megaesophagus.

Since this meeting, two more Heller operations have been done in the same way employing the Bardex catheter in patients with esophageal dystonia (cardiospasm) presenting moderate dilation. Films made one week after operation showed an esophagus of normal size in both instances.

Dr. I. Snapper:—Dr. Bendick is certainly correct in his statement that the importance of the paraesophageal hernia for the causation of anginal symptoms has been grossly exaggerated. All the patients who have been shown to me with typical anginal complaints and negative electrocardiograms, but with characteristic roentgenograms of a paraesophageal hernia, have succumbed suddenly, within two years after I saw them. Although they had normal electrocardiograms and true paraesophageal herniae, nevertheless they had coronary insufficiency and died of coronary thrombosis.

CARCINOMA OF THE ESOPHAGUS, DIAGNOSTIC AND TREATMENT PROBLEMS*

JOHN L. POOL, M.D.
New York, N. Y.

Introduction

Carcinoma of the esophagus is as yet an unsolved problem. There are great difficulties in early diagnosis. There are also great difficulties in effective treatment.

Diagnosis

Diagnosis of esophageal cancer early in the course of the disease is difficult because the symptoms are so subtle. Dysphagia is a late symptom and means that the esophageal lumen has been circumferentially blocked by the growth. Esophageal cancer does not grow as a napkin ring about the whole lumen of the esophagus but starts at a single point and grows outward in all directions from that point making an ever enlarging disc. The lateral edges curl inward towards each other, and only when they approach each other within a distance of a cm. or two does blockage of solid food become appreciable. The esophageal wall is tremendously distensible and the muscles of propulsion are strong. Therefore, a lumen decreased by ¾ may still not produce more than minimal hesitation during deglutition or a sense of fullness on rapid drinking. Pain is not an early symptom of esophageal cancer because pain in this organ is related to either digestive ulceration of the mucosa or acute distention. For instance the chronic enlargement of the organ in achalasia does not produce pain, and a surface ulceration of carcinoma is not a painful phenomena until inflammation has passed through the wall of the organ to produce a periesophagitis with fixation to adjacent prevertebral fascia, aorta, or lung. Unfortunately the early symptoms are indistinguishable from symptoms that may occur during the wear and tear of ordinary eating and drinking, or rather from extraordinary eating and drinking[14]. For instance the substernal tightness following a very cold drink may, in early esophageal cancer, be reproduced with a less cold drink, and a scratchy soreness in the throat which may follow the bolting of large pieces of meat or the drinking of too hot coffee may appear even during more careful eating in the presence of esophageal cancer. The hesitation of the propulsive act due to slight muscle spasm at the level of the cancerous ulceration may be first noted for liquids rather than for solids. In the cervical esophagus a constant sore throat may be the only complaint and have no particular relation to eating or drinking. In the lower esophagus one may

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deal with evidences of esophagitis; that is to say, heart-burn, eructation and epigastric tightness. As Merendino[7], Brewer[2] and others[3,15] have pointed out—there is an intermittency to the early dysphagia. In well advanced esophageal cancer the patient can usually quite well determine the upper level of the growth by pointing to the appropriate level on the chest, but early in the disease no matter what the level of the cancer, the symptom of discomfort will often be referred either to the suprasternal notch or to the epigastrium. In early esophageal cancer it does not seem to be true that regurgitation is aggravated by lying down as is the case with diverticulum or achalsia, or that pain is activated as is the case with hiatus hernia of any size. The late symptoms of esophageal cancer, namely weight loss, slow swallowing, hoarseness due to vocal cord paralysis, the presence of a supraclavicular node of which this disease is the second most common site after the lung, or pain in the back: These symptoms need not concern us today because they so obviously point to this disease. The only way that early diagnosis in esophageal cancer can be achieved is by having a high index of suspicion of this disease in patients with minimal digestive or swallowing symptoms, and in patients, particularly men over 45, coming to the physician with other complaints. The physical examination is most unrewarding in carcinoma of the cervical esophagus. Even when quite advanced, there is absolutely nothing to feel unless lymph node metastases have occurred. On firmly grasping the larynx and moving it laterally, there is normally a faint grating sound over the vertebral bodies and no discomfort is experienced by the patient. If the tumor is as high as the cricopharyngeus or invades the postcricoid area, there is no click on this maneuver but pain is still not present. Another point concerns the value of mirror examination of the pharynx. This procedure is only natural by any physician consulted by a patient with a sore throat, but it must be remembered that the base of the piriform fossa, the entrance to the esophagus, and even the postcricoid area cannot be seen with the mirror. In several instances, I have seen patients where delay of 2 to 6 months occurred because mirror pharyngoscopy was negative and the patient was given reassurance rather than offered further investigation for the cause of the sore throat, which was obviously as yet undiagnosed, when the mirror examination failed to disclose any abnormality. Such further examinations are, of course, x-ray study and esophagoscopy. I should like to urge the second procedure in addition to x-ray examination in all patients with esophageal complaint. Esophagoscopy should certainly not be carried out until a barium x-ray study has been done so that the configuration of the esophagus is known to the endoscopist. Small plaque-like infiltrates of esophageal mucosa are more readily detected through the esophagoscope than by x-ray, particularly when lying immediately below the spastic cricopharyngeus pinchcock, and this is the area most common for origin of carcinoma in the cervical region. A somewhat similar difficulty in the early diagnosis of mucosal lesions at the distal esophagus adjacent to the cardia and adenocarcinomas of the gastric mucosa just below the cardia, for that matter, also exists where resolution of the diagnosis by esophagoscopy can be counted upon.

Taking the esophagus as a whole, the disease is most common in men in their 60's and occurs in a ratio of 5:1, men to women, but in the cervical esophagus this ratio is only 1.7:1[16]. So in women of any age complaining of otherwise undiagnosed sore throat or swallowing difficulty, carcinoma of the cervical esophagus must be considered. Other diseases with which we have had conflict in the differential diagnosis include (1) foreign body, (2) retroesophageal abscess, (3) Plummer-Vinson syndrome with avitaminosis, (4) globus hystericus, (5) pharyngoesophageal diverticulum, (6) osteoarthritis of the cervical spine.

Carcinoma of the intrathoracic esophagus presents, in its early stages, absolutely no physical findings and one can only be alert to minor swallowing difficulties of intermittent nature in patients seen for other complaints. One patient in our series was a 57 year old woman, the aunt of a fourth-year medical student who noted one night when dining with her that she was eating slower than the rest of the family and she, when questioned, admitted that her food for a few weeks had not gone down as easily as before but that she could eat everything and had no pain. Despite her remonstrance he immediately insisted on x-ray studies which were not conclusive. Esophagoscopy revealed a tumor without mucosal ulceration just proximal to the carina and at operation a leiomyosarcoma only 2 cm. in diameter was successfully resected. Watson has reported the presence of a second primary in 15 per cent of a large series of esophageal cancers, the second primary usually lying elsewhere in the upper respiratory or digestive tract. Therefore, in the original study and subsequent follow-up of patients with carcinoma of the tongue, pharynx, extrinsic larynx, or buccal mucosa it is well to keep an eye on the esophagus.

In x-ray study of the intrathoracic esophageal cancer, pulmonary mestastases and encroachment on the bronchus or trachea is looked for. Furthermore the size of the lesion can often be determined, by which I mean not just the outline of the barium-filled lumen, but the soft tissue density as best seen in the lateral view. This size of lesion may be a factor influencing the type of treatment determined upon. There are two characteristic types of gross pathology. The one is polypoid and may be quite bulky both within the esophageal lumen and in length of esophagus involved. As a rule these lesions tend to remain within the esophageal muscle coat and are therefore more amenable to excision than the other or infiltrative epithelioma which so rapidly invades all coats of the esophagus producing fixation and usually precluding anything other than palliative resection. The x-ray study will usually, not always, indicate multiplicity of endoesophageal deposits and in our experience at least one quarter of the intrathoracic cancers will show discontinuous spread by way of the submucosal lymphatics to other sites on the esophageal mucosa. At esophagoscopy such lesions are always searched for and at times can only be suspected by finding mucosal areas of flattening and stiffness on air insufflation. Esophagoscopy will also more accurately determine the proximal level of the malignant lesion which may be several centimeters superior to the margin of

gross polypoid ulcer due to intramucosal extension. Biopsy with confirmation of the diagnosis is achievable in 95 per cent of the patients scoped though sometimes the presenting superior surface of the tumor is covered with mucous membrane hiding the carcinoma from direct inspection, but, a specimen can still be secured with a fine curette or by esophageal washings to be studied by the method of Papanicolaou. In evaluating the extent of carcinoma in the middle or upper third, bronchoscopy is an essential adjuvant because only in this way can adherence, fixation or actual invasion of the bronchus be determined.

In the differential diagnosis of carcinoma of the intrathoracic esophagus I have been confused by congenital short esophagus with stricture due to peptic esophagitis, achalasia, hiatus hernia, in 40 per cent of which Harrington[5] has pointed out anemia will be present, and by secondary cancers usually from the lung, breast, thyroid, or Hodgkin's Disease. In this respect it is well to have a thorough history of previous diseases and operations both from the patient and from some member of his family or the family physician for often patients will be unaware that a previous operation, say for ulcer or goiter was really for removal of a cancer. I have also seen esophageal obstruction simulating carcinoma due to foreign body such as a large bolus of meat or a chicken bone with partial perforation, and from chemical stricture. I have never seen either tuberculosis or syphillis producing esophageal obstruction though such cases are reported. Peptic esophagitis occurring in an ectopic area of gastric mucosa can certainly lead to esophageal stricture and this entity can more closely simulate esophageal cancer than any of those previously mentioned because there is no clue either in multiplicity of site, marked proximal dilatation, or derangement in the normal position of the cardia in relation to the diaphragm and as regards satisfactory valvelike action to differentiate this lesion from carcinoma. Finally a previous esophagogastrostomy, as for instance for achalasia, may result in a very evident stricture which could be confused with esophageal cancer.

Treatment

The treatment of esophageal cancer poses as yet an unsolved problem equally as difficult as the early diagnosis[1,9]. In one hundred patients seen in our hospital in 1949 and 1950 the average delay from first symptom appreciated by the patient until treatment was instituted was 4 months and this is perhaps half the life expectancy of untreated esophageal cancer and a quarter of the life expectancy with treatment. The patient and first physician consulted are equally culpable in contributing to the delay. The physician's delay seems to be based on two different premises: (1) The doctor first consulted treats symptoms without first establishing the diagnosis. (2) The other reason for the physician's delay occurs when the physician of first choice makes the diagnosis but believes no treatment other than symptomatic is indicated in which case the patient does not apply for more active help until symptoms become severe, usually when

obstruction to swallowing is complete. The choice of treatment is always a difficult question and there is tremendous room for improvement in both surgical and radiotherapeutic methods. Franz Buschke at the Radium Society meeting in June of this year (1952) evaluated reported 5-year survivals following both surgery and radiation therapy in the best clinics and found that the end results were approximately the same, 6 per cent of all cancers seen. The choice of method must obviously, once it is determined that the lesion in that particular patient is amenable to an attempt at cure, be individualized on the basis of several factors. (1) the level of the lesion; (2) the size of the lesion; (3) the age of the patient; (4) concomitant disease; (5) the patient's temperament and (6) available treatment facilities. Lesions above the clavicle are most amenable to surgical extirpation[9,17], but it is extraordinarily difficult by x-ray methods to determine the inferior limit of a cervical esophageal carcinoma because the obstruction will usually prevent proper filling of esophagus distal to the lesion, and often only by exploration at operation can this point be determined. If the cancer extends behind the clavicle, repair through a cervical approach alone cannot be achieved, and for these lesions of the superior thoracic strait, I prefer radiation. Intrathoracic carcinomas can be treated by either method, but if the tumor is so adherent to the bronchus or trachea, even without actual invasion of respiratory mucosa, radiation is preferable because dissection off the bronchus will often lead to spillage of cancer cells throughout the surgical area. In the distal third of the esophagus surgery is definitely the preferable method. The size of the lesion, or rather its extent in distance along the esophagus, does not preclude resection per se. The age of the patient should be thought of as his physiological rather than chronological age in the assessment of cardiovascular and renal function, and it is our experience that thin and wiry patients over the age of 70 tolerate resection more successfully than cancerocidal radiation therapy. The patient's temperament may play a deciding part in whether he should be asked to face a major surgical procedure, or on the other hand whether he can be relied upon to report regularly for his radiation therapy over a 4 to 6 week's period.

There is no operation really fulfilling the full criteria of a cancer operation for the esophagus. Ideally the entire organ should be removed with all its primary lymphatic drainage pathways. This would be resecting the esophagus, from pharynx to cardia, the associated paraesophageal and lateral neck nodes, the mediastinal paratracheal and subcarinal and bilateral hilar nodes, and the whole complex paracardial, lesser omental, splenic hilum, and parapancreatic nodes. Such a block dissection of lymphatics is not practical, and only the as yet localized carcinoma can be excised with anything like a chance of total extirpation. This is borne out by the better cure rate in carcinoma of the lower third of the esophagus removed in continuity with the gastric cardia and adjacent subdiaphragmatic lymphatic drainage tract as compared with other levels in the esophagus where block dissection of the lymphatics is impossible[4,12]. In the cervical esophagus it is possible to remove just the organ and replace it with a skin-

lined tube in stages or primarily by a wire mesh cylinder covered with skin or fascia lata[11]. This provides a very satisfactory palliative procedure where trachea or larynx are not invaded, but the more satisfactory cancer operation involves resection of the cervical esophagus with larynx and bilateral neck dissection. There are 2 such patients in the clinic who have survived 3 years.

The lower third lesions can best be resected through a left thoracotomy or thoracolaparotomy and a large esophagogastrostomy constructed below the aortic arch. Despite the concomitant vagotomy, Ripley, Olsen, and Kirkland[10] of the Mayo Clinic found peptic esophagitis in 28 of 65 such procedures; not all of these were for cancer. Barrett and Franklin[1] and others have reported similar findings. We found such late strictures also, the most interesting being a 68 lb. Puerto Rican woman with a middle third carcinoma who had all but the proximal 2 cm. of her esophagus resected with a large stomal connection to the gastric fundus preformed in the neck. Four months later, pain in the lower neck became apparent and on esophagoscopy a fiery red, superficially excoriated mucosa was seen above the stricture. Despite dilatation, bland diet and antacids, the situation went on to an undilatable fibrous stricture. Eleven months after the resection, re-exploration of lower neck showed no recurrent carcinoma, but such woody induration in the superior mediastinum that reconstruction of the esophagogastrostomy was impossible and a jejunostomy had to be resorted to.

Pyloroplasty does not prevent the above complication but is, in our opinion, an essential to prevent struggles with anorexia, weight loss and fullness on eating. In 4 patients this procedure had to be carried out as a separate operation as late as 1 year after the esophagectomy, and in all there was immediate improvement in the sense of well being, especially in the ability to tolerate though not exactly enjoy food.

The middle and upper third intrathoracic esophageal lesions are best handled by abdominal exploration with mobilization of the stomach and pyloroplasty plus a right posterolateral thoracotomy[6] allowing readiest access to the areas of difficult dissection between the tumor and mediastinal structures, especially the aorta. Whenever sufficient easy length of stomach is available the anastomosis is carried out in the neck. This is a 6 and often an 8 hour procedure, and in patients with emphysema, impaired renal function, or incipient heart failure due to myocardial fibrosis the chance of death is great, at least 30 per cent.

Palliation is perhaps the most important aim in esophageal cancer, and in our experience leads us to the conclusion that not one of ten patients undergoing x-ray therapy can maintain reasonable weight without gastrostomy. The Janeway gastrostomy performed under local anesthesia high up at the costal margin carries an operative risk of only 8 per cent in some 60 cases, and need not be the bugaboo so many have called it[13]. The important points in success are high position of the stoma, insertion of a 16 or 18 French catheter only for feedings, feedings with the patient sitting up, slowly taken and *not ice cold,* but at body temper-

ature. Where resection of all the cancer is impossible, we believe palliative removal is still in order or a by-pass to restore swallowing function. This opportunity occurs only, however, when one is attacking a lesion with the hope of cure and finds unsuspected invasion of irremovable adjacent structures or metastasis to irremovable lymph nodes. With the patient already thus committed to operative intervention restoration of swallowing function offers the best palliation and residual areas can be treated with radon seeds and x-ray therapy. X-ray therapy when used as a primary modality cannot anymore than surgery arrest extensive esophageal cancer, and therefore, prior to treatment decision must be made whether palliation or an attempt at cancer destruction is desired. The latter can only be hoped for in lesions small enough to withstand heavy irradiation and even then the result may be discouraging. We have seen 2 patients with apparent primary resolution of mid-thoracic esophageal carcinoma in whom local recurrence appeared 7 years after the therapy. Whether multiple field technics, 1,000 K.V., or rotation therapy is employed, the radiation therapist must have as accurate a sense of esophageal anatomy as the surgeon in order to offer any chance of tumor destruction.

Conclusions

1. Early diagnosis of esophageal cancer is not at present being achieved. There is need for a constant awareness of this disease.

2. Refinements in surgical and radiation technics will yield more long term survivors.

3. Palliation requires much attention, combinations of surgery and radiation, and is well worthwhile.

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Discussion

Dr. O. H. Wangensteen:—Cancer of the esophagus is a sobering subject. I think all of us have been impressed with the thoughtful and thorough discussion of the subject by Dr. Pool. I am rather a novice in this field. I have described myself as a plumber of sorts of the alimentary tract. I have worked at both ends, but more often in between. I am optimistic enough to believe, however, that surgeons of Dr. Pool's ability, competence and persistence will stay at this and will eventually resolve the problem of surgical management of esophageal cancer.

Julius Caesar formulated an old military maxim of "Divide and conquer", and I think still in every sphere of man's activity, it is a good instruction for all of us. It tries one's patience but I know of no other way in which one can push the learning process forward. Occasionally one can jump over big obstacles, but not very often. In most problems, the solution is arrived at bit by bit after much labor and confusion. Such is all experience.

Historically I suppose there is no more interesting chapter in all surgery than cancer of the esophagus. Here in New York, Franz Torek at Lenox Hill Hospital, first succeeded with the exteriorization operation in 1913. That operation subsequently was done all around the world. In a monograph on the esophagus by von Hacker and Lotheissen (1926), they alluded to about 100 cases of cancer of the esophagus culled from the literature. They found no other successes to record other than patients who survived for two to three weeks after operation. Now, surgeons have exteriorized the exteriorization operation, not alone for the esophagus but for the bowel as well.

I suppose today what Dr. Pool has said concerning the cervical and upper thoracic esophagus would go for most surgeons of experience. And I must confess that, with cancer of the cervical esophagus, I have had no experience. In our clinic, my associate, Dr. Arnold Kremen, has done some variant of the Wookey operation for cancer of the cervical esophagus. As I have gained additional experience with lesions of higher reaches of the thoracic esophagus for cancer, I have come to be sanguine enough to believe that, as we dissect this problem and learn more about the components of success in this area of work, surgery will take the field. Today because of the poor accomplishment of the surgeon with cancer of the cervical esophagus that group of esophageal cancers must be divided with the radiologist.

As Dr. Pool has said, for the lower esophagus the results are good. Dr. Sweet, reporting, I believe, in the January, 1952, issue of *Surgery, Gynecology and Obstetrics* reports his experience with the surgical management of esophageal cancer. He, perhaps more than any other surgeon in the world, has had a large experience with cancer of the esophagus. He said his experience with the upper thoracic esophagus was so poor he hesitated to record it. Yet, I think surgeons must continue this difficult struggle. As Dr. Sweet said, and Dr. Pool reported here today, cancers of the lower esophagus can be treated with a reasonable mortality, definitely under 15 per cent. And in those patients with no lymph node involvement, the five-year survival in Sweet's experience was approximately 40 per cent. In those with positive lymph nodes, the five-year survival was around 12 per cent, as I remember. These results are not good, but they are not poor, and I think they will improve.

You will recall that some of Dr. Pool's specimens were short, and some were long. I am sure Dr. Pool feels happier over those in which a long normal segment of esophagus was present on the excised specimen, proximal to the lesion. In reviewing our own cases of cancer of the esophagus, I find those in which we ultimately have done the poorest, were those patients in whom we removed only a centimeter or two proximal to the lesion. One has to do much better than that. Dr. Pool indicated what one should do; but what one can do and what one finds it most expedient to do at operation are often quite different. Occasionally, it is found necessary to take out the greater length of the thoracic esophagus to catch extra multiple lesions, which all of us, who affect an interest in this field, have seen now and then.

I should like to allude to some of the things that have taught me some lessons. Dr. Pool, I believe, spoke only of the stomach for anastomosis. It is the most convenient organ, and that is about all there is good to say about it. The stomach is a digestive organ, and the esophagus is very sensitive to acid-peptic juice, so sensitive it startles you. I had thought of adding only this much to the discussion, but Dr. Pool's provocative discourse on the subject provokes me to say more, to say something, when I am here in the confessional, about lessons I have learned about cancer of the esophagus.

I have lost patients in whom a satisfactory anastomosis has been made because of the retention of gastric juice in the stomach—from erosion of the esophagus as well as from gastric hemorrhage. One such patient is particularly interesting. The patient, a man of forty years, had been explored by a well-known thoracic surgeon and rejected for resection because of the intimate adherence of mid-thoracic lesion to the mediastinal structures. I was able to excise it. The *vena azygos* was divided, the stomach was brought up through an aperture in the right diaphragm anterior to the lung and the anastomosis was made in the upper thorax. The patient did well, and when he was being readied for dismissal on the eighth day after operation the esophagus perforated. Drainage was established and the patient got along very well once more. About a week

later, when we were considering dismissal again, a severe hemorrhage occurred. I opened the chest and opened the stomach. There was a large clot in the stomach and several deep ulcers. An elliptical longitudinal excision was made of the stomach converting it into a narrow tube. A fistula formed. Subsequently, I exteriorized the upper thoracic segment in the neck and excised the residual acid secreting area of the stomach. The patient died three weeks subsequently of a staphylococcal bacteremia.

In looking back at all this, I believe a Heineke-Mikulicz pyloroplasty would have been much better than the original linear open myotomy. Moreover, I am inclined to believe that the diaphragm should have been paralyzed to eliminate any suggestion of interference with emptying of the vagotomized stomach. On that score, there probably is some advantage in bringing the stomach up through an enlarged hiatal esophageal orifice, rather than bringing the stomach through a more anteriorly placed aperture in the diaphragm. Less compression of the stomach, with ensuing retention, will probably occur when the right crus is cut to permit the transplanted stomach to lie in the esophageal hiatal orifice.

Atony of the stomach appears to be one of the real major problems attending migration of the stomach high into the thorax. For low esophageal resections, a goodly segment of the stomach remains below the diaphragm, the periodic descent of which may help empty an atonic stomach. In any case, I do believe than an entire stomach in the thorax when vagotomized may afford real problems in emptying.

On completion of the operation, in old patients, I usually thread a 14 French duodenal tube with 4 holes at the tip backward through an enterostomy placed just beyond the ligament of Treitz. This tube can be used to remove gastric juice and to prevent retrograde regurgitation into the trachea. Later in convalescence, it can also be employed for purposes of feedings.

In old patients, I also establish an enterostomy for feeding—a 14 French Robinson urethral catheter is placed for the purpose a few centimeters distal to the catheter placed in a retrograde position mentioned above. The ability to feed a debilitated patient fairly directly after operation is an important consideration.

The last point I want to make is that, I think, here more than any other place in the body, there is need to use the closed anastomosis. Churchill emphasized the necessity of making an open anastomosis because of the hazard of stricture formation. My experience in total gastrectomy employing the Roux-Y principle of anastomosis with the closed method has been eminently satisfactory. It is to be admitted, however, there is no opportunity for erosion of the esophagus by gastric juice here, as occurs in the conventional esophagogastric anastomosis for esophageal cancer. The lumen of the esophagus contains hemolytic staphylococci, and of all organisms against which our antibiotics have not been too helpful, I would say that hemolytic staphylococcus is probably the worst.

I believe, therefore, there is justification for the closed anastomosis; I think it should be said too that the only recommendation for use of the stomach in the anastomosis is its convenience. During recovery from the operation and the anesthesia the secretions from the mouth must be carefully and frequently aspirated. I like to have the intratracheal tube remain in place until the cough reflex returns. The secretions from the stomach can be aspirated by means of the retrograde placed tube in the stomach which I alluded to earlier. A Heineke-Mikulicz pyloroplasty and temporary paralysis of the diaphragm help to avoid gastric retention and some of the erosive effects of gastric juice upon a stomach with diminished motility.

I think Dr. Pool has presented a very important paper for our consideration. I would say this to him: Be patient: Keep on trying. We will lick this difficult problem yet. We will do well to remember how Billroth struggled with the problem of cancer of the stomach. Everyone was thrilled with his first operative success. Then poor results with large operative mortalities were reported. We were gratified when cancers of the stomach could be dealt with successfully in our own Clinics. Friedenwald reported in 1914 there were no five-year survivals of gastric cancer in the Johns Hopkins Clinic. However, the results in gastric cancer are improving constantly. The technical problem of dealing with gastric cancer has largely been resolved. The diagnostic problem now is the important one. In cancer of the esophagus the problem of treatment still has to be won. I have the feeling that surgeons must give more thought to excision of longer segments in the esophagus for cancer. That aspect of the problem is fully as important as the lymph node problem. I am pleasantly surprised to learn from our pathologists how often an adherent esophageal cancer, when grubbed out at operation, is found to be free from lymph node involvement. This circumstance in adherent gastric cancers is a rare occurrence. For cancers at the thoracic inlet and in the cervical esophagus, use of the colon for the anastomosis would appear to be the operation of greatest promise.

Dr. I. Snapper:—I would like to ask Dr. Pool how often do perforations occur during esophagoscopy? Antibiotics have made the prognosis of these perforations much more favorable but nevertheless the dangers of esophagoscopy are greater than the risks involved in bronchoscopy or gastroscopy.

Dr. John L. Pool:—I don't know whether I can answer you accurately, Dr. Snapper, because we are in the process of collecting our figures on esophagoscopy, so this would be a guess. I can only remember seeing one case that we so diagnosed and it is probably one experience in about four or five hundred. I think this is only from talking with other people doing esophagoscopy. We always do it under topical anesthesia. I have a feeling from talking with others, that esophagoscopy done with curare and pentothal, runs a greater risk of perforation, but that is only an impression.

ENDOMETRIOSIS OF THE COLON AND ITS TREATMENT*

S. L. GOVERNALE, M.D.†

and

CARLO A. FIORETTI, M.D.‡

Chicago, Ill.

Although endometriosis with involvement of small and large bowel is encountered only occasionally, it is sufficiently serious and frequent to justify a position among the important benign lesions of the colon. Its insidious invasive tendencies often create sufficient clinical and roentgenologic uncertainties to mistake the lesion for a malignant neoplasm. For example, five cases of polypoid endometrioma of the colon with an incredible resemblance to carcinoma of the

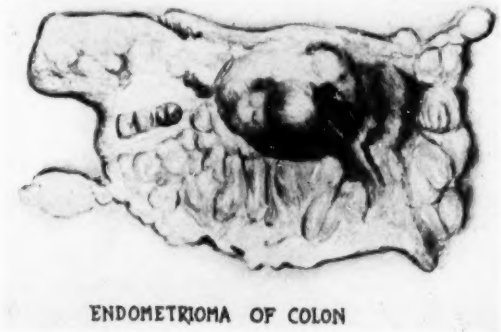

Fig. 1—Depicts drawing of resected specimen of the sigmoid colon containing large endometrioma observed in Case I.

colon were reported recently[1,2,3,4]. In three of these the surgical specimens exhibited regional paracolic lymph node involvement due to endometriosis.

Our purpose here is to present three additional cases, in which endometriosis caused a partial obstruction of lower colon and in which a differential diagnosis could not be reasonably made at operation.

Incidence

We have found approximately 181 cases of endometriosis of the small and large bowel reported in the literature. The first recognized case of large bowel

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†Chief of Surgery, St. Bernard's Hospital, Chicago, Illinois.

‡Senior Surgeon, St. Bernard's Hospital, Chicago, Ill.

From the Department of Surgery, Stritch School of Medicine, Loyola University, Chicago, Illinois.

obstruction caused by endometrioma was published by Meyer[5] in 1909. Since that time, many observers have contributed reports on the various aspects of this entity.

TeLinde and Scott[6] found an incidence of 22 per cent in all pelvic laparotomies at Johns Hopkins Hospital.

Cattell[7] reported 104 cases of endometriosis treated at Lahey Clinic, 17 of which involved the sigmoid colon and rectum. Fallon and associates[8] in a study of 410 cases of endometriosis, report an incidence of 23 per cent involving the sigmoid colon.

Twenty-two to thirty-six per cent of the pelvic laparotomies disclose evidence of internal or external endometriosis involving the pelvic viscera.

Fig. 2—Annular carcinoma drawn from resected specimen of the sigmoid colon with multiple polyps.

Age

There is no specific age limit in the occurrence of endometriosis. It has been observed in the literature as young as 10 and as old as 69 years. However, the average age occurrence is in the third decade.

Etiology

Many theories on the cause of endometriosis have been presented. Sampson in 1921, described the only sound theory relative to the etiology of this entity. His contention was that endometriosis owes its origin to the transmigration of endometrial cells by way of the oviducts becoming secondarily disseminated into the pelvic peritoneum, hence involving the colon.

Symptoms and Diagnosis

Diagnosis of endometrioma is based upon age, relative or absolute sterility, pelvic pains, menstrual irregularity and constipation.

Pelvic pain, metrorrhagia, dyspareunia, rectal effluvia, diarrhea and large bowel obstructive phenomena are pathognomonic of endometrioma. They are worse during menstruation and then tend to taper off between and during the cycle.

Bimanual examination may disclose painful nodularity of the cul-de-sac with an adnexal mass. Sigmoidoscopy usually reveals an intraluminal occupying mass without ulceration of the mucosa. Biopsy material shows an inflammatory reaction without malignant degeneration. Roentgenologically, a kinked, puckering

Fig. 3—Polypoid carcinoma. Here the lesion is viewed as a huge intraluminal occupying mass. In contradistinction to endometrioma, this tumor invades and ulcerates the colon mucosa. Bleeding is a concomitant.

obstruction of the colon without crater formation is suggestive of endometrioma. Usually, a much larger segment of the gut is involved than is seen in cancer of the colon. Melena, cachexia and anemias are absent. Laboratory data are, as a rule, noncontributory and roentgenologic studies are equivocal.

Other lesions simulating endometrioma are: cancer, diverticulitis, linitis plastica, radiation proctitis, granuloma venereum of the rectum and polypoid endometrioma of the colon.

Treatment

Treatment of endometriosis consists of radiation, androgenic therapy and conservative surgery, in the young nulliparous women. Radical surgery is advocated after the age of 40, which comprises castration and segmental resection

of obstructed colon with an end-to-end anastomosis. Surgery becomes mandatory, irrespective of age, when a complete or partial colonic obstruction exists. Hemicolectomy is not necessary, once the histologic diagnosis is confirmed and cancer ruled out.

In our experience, we have been able to attain a temporary cessation of the foregoing symptoms by androgenic therapy in the younger patient.

Pre- and Postoperative Care

Discussion of care of the patient both pre- and postoperatively has been omitted from this paper because of its frequent mention in the literature and its

Fig. 4—Shaded area represents location of endometrioma and angulation of bowel diagramatically (Case 1).

apparent standardization. It may suffice to mention that where a subtotal resection of the colon is anticipated, a preoperative antibiotic regimen might prove advantageous for the prevention of postoperative local complications.

Operation

The patient is anesthetized by sodium pentothal induction followed by ether.

The author employs the following technic of limited colectomy in endometrioma:

The abdomen is entered by a left low paramedian incision. As some implants may be missed, all pelvic organs are studied visually under a good strong light

and not merely palpated. The segment of bowel is freed of its adherent adjacent structures and the involved colon is resected between intestinal clamps. Adjacent lymph nodes are identified and frozen section studies executed to rule out carcinoma. Both segments of the colon are sufficiently mobilized to prevent tension at the site of anastomosis. Continuity is established by any of the well known methods of the surgeon's choice. The author prefers an open, end-to-end, interrupted technic, using triple 0 black silk.

A colon tube at the site of anastomosis is not recommended. Wangensteen intubation (oral), however, for two to three days has been most useful in our experience.

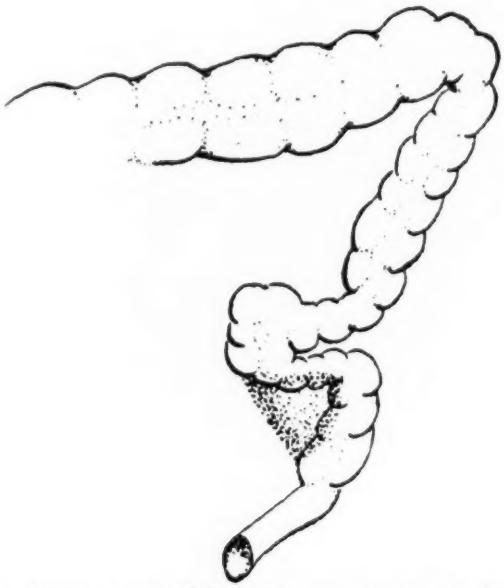

Fig. 5—Discloses a schematic pattern of deformed, narrowed sigmoid colon with localization of the endometrioma as shown by shaded area (Case 2).

Antibiotics, vitamins, electrolytes and blood replacements are left to the discretion of the individual surgeon.

In the following three cases of the author's, endometriosis caused partial obstruction of the lower colon.

Case Reports

Case 1:—B. A., a housewife, aged 32, para 4, was first seen in April 1949, with a history of having been hysterectomized one year previously. Pelvic pain, constipation, dyspareunia and backache had not been relieved by surgery.

The patient was not acutely ill. Examination revealed tenderness over the left lower quadrant, resistant tender mass in the left iliac fossa and a thickened, nodular cul-de-sac. Both urinalysis and blood studies were normal. Laboratory studies were not contributory.

At operation on May 19, 1949 an adherent mass was found on the medial aspect of the pelvic colon. Effects of puckering of the colon had produced a partial colonic obstruction.

Segmental resection with an end-to-end anastomosis effected a cure of her symptoms.

Fig. 6—Shows advanced endometrioma of rectosigmoid adherent to uterus. In freeing uterus from colon, a perforation in colon resulted. Simple purse string sutures executed. Some leakage ensued as noted by a low grade peritonitis and recurrence of previous hernia. This patient was lost from our postoperative follow-up series (Case 3).

Pathologist's report was endometrioma of the colon.

This patient has been completely relieved of her previous symptoms and bowel function is normal.

Case 2:—Sr. A., single, aged 39, underwent an emergency operation for a suppurative appendix by the author, in March 1951. Gross evidence of external and internal endometriosis was noted. For obvious reasons definitive surgery on the reproductive system was not deemed advisable at that time. However, her right ovary was removed because one of its many chocolate cysts had been accidentally ruptured at surgery.

Despite this surgery, the symptoms of diarrhea, pelvic pains, backache and menorrhagia continued. Examination four months after surgery, disclosed an indistinct mass in the left adnexa and nodularity of the thickened cul-de-sac.

At the second operation, August 1951, many bluish endometrial implants were noted on the uterus, left ovary, bladder and entire pelvic peritoneum. A small mass, adherent to the left ovary and tube was palpable on the pelvic colon. Its lumen appeared kinked and obstructed. Panhysterectomy, bilateral salpingo-oophorectomy with segmental resection of the obstructed colon was performed. End-to-end anastomosis reestablished colonic continuity.

Pathologist's report was endometriosis of the colon.

The right ureter was accidentally cut, but anastomosed, with excellent function 14 months postoperatively.

Case 3:—M. C., a housewife, aged 50, nulliparous, complained of long standing episodes of headaches and diarrhea alternating with constipation, metrorrhagia and pain in the left lower quadrant. There were no bloody stools.

Examination revealed a small incisional hernia, and tenderness in the left lower quadrant with an indistinct mass. Uterus was firm, large and extremely fixed. Sigmoidoscopy showed thickened inflammatory, puckered mucosa on the anterior wall of the colon 18 to 20 cm. from the anal verge.

At operation February 25, 1948, adenomyosis with an adherent cystic mass between the uterus and anterior rectosigmoid was discernible. In performing a panhysterectomy and bilateral salpingo-oophorectomy, a defect was noted in the colon. This of course, resulted from removal of the endometrioma of the colon. Because of the low lying lesion on the colon, resection seemed unjustifiable. Simple suturing of the defect was done. The pelvic cavity was drained.

Pathologist's report was endometrioma of the colon.

Follow-up on this patient was not possible.

Comments

Endometriosis is the occurrence of displaced endometrial tissue other than in the uterus. Once endometrial shedding becomes displaced each area is symbolic of a uterus in miniature. The implant is subject to periodic hormonal influence; it matures and menstruates without the benefit of a cervical canal. Accumulation of the unsuitable effluvium is conducive to spreading of the multiple implants; (1) by rupturing of the cysts, (2) local irritation with its concomitant reactive fibrosis and (3) dense adhesions. Hence, a small cyst on the wall of the colon undergoes maturation, and ruptures, and its shedding in turn regenerates other cysts, which by their force of tissue build-up, develops increased tension into formidable adhesions capable of angulating, shrinking and occluding the lumen of a susceptible colon.

About 27 per cent of the patients with endometriosis have no symptoms; 33.5 per cent fail to become pregnant and 46 per cent never have full term pregnancies.

Summary

The literature on endometriosis of the colon has been reviewed and three cases of the author's have been presented.

In this disturbance a limited resection of the colon is recommended rather than a wide resection as routinely performed in carcinoma of the colon.

For the younger group of patients, a conservative surgical procedure is advocated in contradistinction to more radical surgery in the older group of patients.

It is emphasized that the differential diagnosis of endometriosis of the large and small bowel is difficult and its existence should be borne in mind in a suspect complete or incomplete intestinal obstruction.

Up to 1947 a large number of cases of endometriosis of the bowel were discovered during laparotomy. Today, however, because of improved diagnostic acumen this entity can be diagnosed preoperatively with greater frequency.

Addendum

Since the presentation of this paper we have had an additional case of endometrioma of the colon.

Case 4:—A 42-year old female complained of intermittent menorrhagia. At operation on May 1, 1953, advance endometriosis of uterus, cul-de-sac, with chocolate cyst of the right ovary was found. The rectosigmoid colon was also the site of two endometrioma with kinking of the lumen and almost complete obstruction. A panhysterosalpingo-oophorectomy was executed and segmental resection of the involved rectosigmoid with end-to-end anastomosis.

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EDITORIAL

Nine Anniversaries and Some Historical Notes

A number of anniversaries of interest to medicine have recently occurred, which merit, at least, brief mention.

Leonardo da Vinci (1452-1519) was born five hundred years ago. The great and very talented artist drew while the anatomist Marc Antonio Della Torre dissected. As the result, Leonardo da Vinci personally became so interested in dissection that he too dissected and drew the first accurate pictures of dissections available. His skeletons, figures of muscles, and the heart (including the coronaries) are unsurpassed. According to Cardinal of Aragon[1], it was stated by Leonardo himself that he dissected more than thirty bodies of men and women of different ages. Leonardo was an artist of rare instincts and emotions, and ultimately surpassed the brilliance of his teacher and master, the famed sculptor and painter, Verrocchio, of Florence. Among the world's greatest masterpieces are Leonardo's *The Last Supper,* painted on the wall of the old convent refectory at Milan and the *Mona Lisa* in the Paris Louvre, both of which have been viewed by this writer some years ago. He planned engineering projects including military bridges, suction pumps, and even conceived the general idea of an airplane and submarine. Not only as an artist, engineer, anatomist, and physiologist[2], but as a sculptor for a time, and perhaps, as the one who stimulated, (and set-up as "Samples") by his anatomical sketches, the work by Jan Calcar illustrator of Vesalius' early work, and the great anatomical work of Andreas Vesalius that appeared in 1543! ("De humani corporis Fabrica libri septum," Basel, 1543).

Before this, there appeared Vesalius' atlas-compendium "de corporis humani fabrica librorum epitome", Basel, 1542. In 1497, Alessandro Benedetti, professor of anatomy at Padua, published an "Anatomia" in five books. In 1493 he described a case of malposition of the heart, probably the first report on record. Antonio Benivieni may have been his teacher[23]. Vesalius did *not* have the experience in dissecting human bodies as did Leonardo da Vinci. He did demonstrate the coronary vessels and general structure of the heart. Vesalius was the first to observe and describe aneurysm of the thoracic and abdominal aorta.

Joseph Claude Anthelm Recamier (1774-1852). Recamier, the great French surgeon, died one hundred years ago (1852). In 1829 he published his work[3] on *Recherches sur le traitement du cancer par la compression—et sur l'histoire générale de la même maladie.* He was a master of gross pathology, as well as a distinguished surgeon. It was Recamier who, for the first time, described the invasion of veins by cancer and observed that cancer becomes generalized. He coined and used the term *metastasis,* when he described secondary growths in the brain occurring in breast-cancer. He knew that, as a result of chronic irritation, supernumerary organs, nevi, etc. may become cancerous. It is regrettable that this epochal work by Recamier has been forgotten or overlooked!

The first intestinal resection for cancer was done May 2, 1833 by Jean Francois Reybard, of Coisiat, 120 years ago. Reybard[4], a pioneer in intestinal surgery performed the resection of the tumor with three inches of the bowel, and did an end-to-end anastomosis, using silk sutures. The patient recovered from the operation, but recurrence developed and he died on March 16, 1834. The patient was a young man aged 28 years with carcinoma of the sigmoid.

Michael Servetus (1511-1553). Four hundred years ago, Miguel Serveto (Michael Servetus), at the command of John Calvin, was burned at the stake (October 27, 1553), copies of his treatise *Christianismi Restitutio*, Vienna, 1553, being heaped around him as kindling fuel. In book five of his *Christianismi Restitutio* he gives an account of the pulmonary (lesser) circulation, and observed that the blood passed into the heart after it was mixed with air in the lungs[9]. It is 400 years since Servetus stated that: "It is not simply air, but air mixed with blood that is sent from the lungs to the heart through the arterial vein; therefore, the mixture is made in the lungs. The bright color is given to the sanguine spirit by the lungs, not by the heart"[5,6,7]. The Arabian physician, Ibn-an-Nafis (Ca. 1210-1288) in the thirteenth century, six hundred and seventy years ago, first described the pulmonary (lesser) circulation, although this early discovery had been overlooked for many years! Ibn-an-Nafis wrote a commentary on Avicenna's *Anatomy* wherein he correctly deduced the general scheme of the pulmonary circulation. He denied the Galen "invisible pores" in the interventricular septum. Ibn-an-Nafis was dean of the Mansoury Hospital in Cairo. He described the circulation (pulmonary) five times and discussed the general physiologic principles of respiration[10,11]. He knew that the heart was nourished by its own vessels —thus one of the earliest records of the coronary circulation. Leonardo da Vinci, the father of medical illustration, and most gifted personality of the Renaissance, in his drawings of the heart, showed clearly, the large coronary vessels and their main tributaries. He observed that the heart acted as a pump and maintained that the heart-beat and the pulse were synchronous. He discovered the moderator band of the heart. Jacopo Berengario da Carpi, (1470-1550) described the valves of the heart in his *Isagogae* (1552). He followed the course of injections (tepid water) into arteries—one of the earliest of such experiments. Michael Servetus in *Leonardum Fuchsium Apologia* (*Pra symporiano Campegio*), 1536, defended his preceptor, the distinguished Professor of medicine Leonhardt Fuchs, of Tübingen in his attack on Champier for his astrologic beliefs. Fuchs, the botanist—first described digitalis (1542) and coined the term "digitalis purpurea"—and suggested its use for chest conditions "stuffiness", cough, and dyspnea—long before William Withering gave his *Account of the Foxglove* (1785). His attention was first drawn to the plant in 1775 by the discovery that it was important in the treatment of dropsy. The remedy was used by an old woman in Shropshire, "Old Mother Hutton" for the relief of dropsy. Silas Marner (George Eliot, 1819-1880) also used it for his mother's dropsy, and for "Sally Oates", who suffered from congestive heart failure and dropsy. Withering evidently was not aware of the herbal—the illustrated work of Leonhardt Fuchs. Silas Marner cured "Sally

Oates" and made her sleep like a baby, when her heart had been beating enough to burst her body for two months or more while she had been under the doctor's care. Marner gave her foxglove–which had previously been given to his mother, with relief of the dropsy and *dyspnea,* before she died. Fuchsius was born 450 years ago–in 1501 and, although he was one of the famous founders[12] of modern botany along with Otto Brunfels (1488-1534), Valerius Cordus (1515-1544), and Hieronymus Bock (or Tragus) (1498-1554), this distinguished professor of medicine, leading German herbalist, and author of the well illustrated *De historia stirpium,* (Basel, 1542), has been entirely forgotten. To William Wotton[8] goes the credit for first pointing out (1694) that Servetus described the pulmonary (lesser) circulation. As often tragically happens, Servetus' re-discovery was ignored for 150 years (Servetus first observed the lesser circulation in 1546) until Wotton's *Reflections upon Ancient and Modern Learning.* So it is with the failure of all students and many historians to have ignored the contribution made in the thirteenth century by Ibn-an-Nafis, until recent times. The great medical historian Max Meyerhof[13] gave us a translation of the Arabian work; the thesis before the faculty of Freiburg (1924) by a young Egyptian physician Muhyiad-din at-Taivi, on the discovery of the pulmonary circulation by Ibn-an-Nafis, (unpublished), and the publications by Haddad and Khairallah[14] (July 1936), and Oswei Temkin[15] (1940), again revived interest in the first description of the pulmonary circulation in the thirteenth century. While Ibn-an-Nafis and Michael Servetus are credited with discovery of the lesser (pulmonary) circulation–William Harvey (1628) is credited with the discovery of the systemic circulation of the blood, although Colombo and Cesalpino did study the circulation.

William Edmunds Horner (1793-1853)[18] Professor of Anatomy, at the University of Pennsylvania Medical School, who served on the faculty with the great American "professor of surgery" of his time Philip Syng Physick (1768-1837) (who later, again assumed the Chair of Anatomy), died March 13, 1853 one hundred years ago. Horner gave us the first American textbook on *Pathological Anatomy* (1829, Philadelphia), and he also added notes, with additions, to the first American textbook on *A System of Anatomy* by Caspar Wistar (1760-1818) Professor of Anatomy at the University of Pennsylvania Medical School. Horner discovered and described (1824) the tensor tarsi muscle of *orbicularis oculi*[17]. He observed that the "rice water" stools of cholera owed their appearance to the masses of desquamated epithelium. Horner was prosector to Caspar Wistar at the University of Pennsylvania. In 1820, at the age of 27 years, he became adjunct professor of anatomy. When Physick resigned eleven years later, in 1831, Horner became professor of anatomy. His predecessors were William Shippen (1736-1808), who was succeeded by Caspar Wistar (1760-1818); John Syng Dorsey (1783-1818), and Philip Syng Physick, who held the chair of surgery from 1805, as the first American to hold the title of "Professor of Surgery", in the oldest medical school in the United States, the University of Pennsylvania. Horner received his M.D. degree from the University of Pennsylvania April 8, 1814. Wistar received his M.B. degree from the University in 1784, and M.D. in 1786.

It might be stated here that the members of the early founding faculty of Jefferson Medical College of Philadelphia, one of the country's leading medical schools (in the years 1825-1827), were graduates of the University of Pennsylvania Medical School, with some exceptions: Wm. P. C. Barton (M.D. 1808), John Eberle (M.D. 1809), Benjamin Rush Rhees (M.D. 1821), Daniel Drake (M.D., May 1816), Francis Smith Beattie (M.D. 1821), and George McClellan (M.D. Spring 1819) the founder of Jefferson Medical College who died May 9th 1847, of perforation a few inches below the ulcerated sigmoid colon. McClellan studied medicine (1817-1819) at the University with John Syng Dorsey. In 1826, McClellan opened the "McClellan infirmary" at Jefferson. Other eminent men on the early Jefferson faculty were Jacob Green, Nathan R. Smith, Samuel McClellan, John Revere, Robley Dunglison, Joseph Pancoast, Thomas D. Mütter, Charles D. Meigs, Franklin Bache. More recently Doctors Hobart Amory Hare (M.D. Univ. Penna.), Francis X. Dercum (M.D. Univ. Penna.), Martin Emil Rehfuss (M.D. 1909 Univ. Penna.) and other eminent members of Jefferson faculties studied medicine at the University of Pennsylvania just as the early medical faculty members of the University of Pennsylvania (Shippen, Morgan, Adam Kuhn, Benjamin Rush, and others) studied medicine at Edinburgh, Scotland. The first faculty members of Johns Hopkins University Medical School (1892) studied at the University of Pennsylvania (Howard A. Kelly). Osler was a member of the Pennsylvania Faculty before going to Baltimore; and The College of Physicians and Surgeons, Columbia University (William H. Welch 1875, Columbia) and William S. Halsted, (1877, Columbia) eminent American surgeon who was born one hundred years ago (1852). Horner considered arachnitis an integral part of the symptom-complex of alcoholism (1829), and observed the difference in color of the discs of the negro and white. It might be mentioned here, that P. S. Physick in 1836 described *diverticula of the rectum*—one of the earliest descriptions[19]. He was the first American to *wash out the stomach* with a tube and syringe in a case of poisoning (1802) 150 years ago[20]. In 1767, Monro Sucundus invented a similar instrument and, Physick acknowledges this early invention.

Daniel Drake (1785-1852) graduate of the University of Pennsylvania (1816) and Professor of Medicine at Jefferson Medical College of Philadelphia and later founder of medical schools in Ohio; and outstanding in the development of medicine in the Middle West, was born in Essex County, New Jersey, and as a child was taken to Kentucky. He served on medical faculties at Transylvania, Cincinnati, again at Lexington, at Jefferson (Phila.), again at Cincinnati, at Louisville, and finally at Cincinnati again, where he founded another medical school. He delivered an inspiring address on "Medical Education"[21] to the twelfth class (1832) at Ohio Medical College (University of Cincinnati Medical College) —a facsimile copy of this little volume, was recently (1952) published. Drake died one hundred years ago (1852). Although born in abject poverty in New Jersey and reared in a log-cabin in Kentucky, he later became one of the leading physicians and educators in the country. He wrote on milksickness, "the trem-

bles", described epidemic cholera as it appeared in Cincinnati in 1832, and wrote on the "Climate and Diseases of Cincinnati" (1810). Samuel D. Gross and Willard Parker were associated with him in the Cincinnati College. He founded the Medical College of Ohio in 1821, and the Medical Department of Cincinnati College in 1835.

Dr. William Steward Halsted, (1852-1922) one of the most eminent and distinguished of American surgeons and teachers of surgery, was born a century ago (1852) in New York City, and received his M.D. degree in 1877, at the College of Physicians and Surgeons, Columbia University. The centennial of his birth was deservedly and properly observed at Johns Hopkins, Baltimore, and, at the Royal Society of Medicine[22], Section of Surgery, London, England. Dr. B. N. Carter, Professor of Surgery, at the University of Cincinnati, at the recent Halsted Centennial celebration in Baltimore, listed the large number of professors (37), clinical professors (14), associate professors (18), clinical associate professors (14), assistant professors (17), clinical assistant professors (16), instructors (23), and private practitioners of surgery (99)—a total of 238—trained by Halsted, including Harvey Cushing, Mitchell, Bloodgood, and other noted surgeons. Halsted stimulated and encouraged Hugh H. Young in urology, Davis in plastic surgery, Cushing and Walter E. Dandy in neurosurgery, William S. Baer in orthopedics, Baetjer in radiology, and Crowe in otolaryngology. He introduced the residency system in this country for the careful training of young surgeons. The late beloved John Chalmers Da Costa, Samuel D. Gross, Professor of Surgery at Jefferson Medical College, and lecturer par excellence, in 1919, dedicated his textbook of surgery to Halsted: "This book is dedicated to the chief surgeon and inspiration of one of the greatest, most progressive and most influential surgical clinics in the world. A clinic from which come important facts, real ideas and brilliant men. To the operator, the teacher, the investigator and surgical philosopher. To Dr. William Steward Halsted, the distinguished Professor of Surgery in Johns Hopkins University".

Antonio Benivieni (Ca. 1442 or 1443-1502), a contemporary of Leonardo da Vinci and Alessandro Benedetti (and probably, Benedetti's teacher), was a surgeon and practitioner in Florence, and the author of *De abditis nonaulis ac mirandis morborum et sanationum causis,* published posthumously by his brother in 1507. Benivieni died 450 years ago (1502). He reported, in this small volume, twenty postmortem examinations and urged the people to permit dissection of the bodies, to discover the cause of death—probably the first time this was encouraged and the first real attempt to find the cause of death of the patient. Jean Fernel (1497-1558), the outstanding physician of the French Renaissance, gave us the first book on *Patologia,* the great contribution by Morgagni in 1761, *De Sedibus et causis;* Benivieni's *De Abditis Nonnulis* (1507); Matthew Baillie with his *Morbid Anatomy* (1793), and Rudolf L. K. Virchow (1821-1902) placed "pathology" on a firm and lofty pedestal.

Rudolph Ludwig Karl Virchow (1821-1902), of Berlin, died fifty years ago. He was one of the greatest pathologists of all time who advanced our knowledge of pathological anatomy. He described *Weisses Blut* (leukemia)[25], in 1845; John Hughes Bennett (published) described leukemia[26] one month before Virchow. He founded "Virchows Archiv" (1874) "Archiv für pathologische Anatomie and Physiologie und für klinische Medizin." Virchow was a pupil of Johannes Müller. He served as Professor of Pathology in Würzburg, and in Berlin where he was Director of the Pathological Institute of the Charité Hospital. Tumors were Virchow's greatest interest[27]. He was the founder of the doctrine of cellular pathology—*Omnis cellula e cellula*. The seat of disease should always be looked for in the cell (1858, 1895). William H. Welch, of Johns Hopkins University, believed that "The establishment by Virchow of the principles of cellular pathology marked the greatest advance which scientific medicine has made since its beginning." His epoch-making book, *Die Cellular-pathologie in ihrer Begründing auf physiologische und pathologische Gewebelehre* appeared in 1858—nearly a century ago. "It was based on the cellular theory of living structure and the observation that the microscopic appearance of living cells profoundly changed in disease"[24].

Virchow in addition to the first description of leukemia *Weisses Blut* established the strue nature of thrombosis and embolism. He described and defined cloudy swelling, amyloid change, fatty degeneration, ochronosis, heterotopia, agenesia, and other pathological changes and concepts. Virchow was the first to use the term *amyloid*, which he coined, and he gave us "cell doctrine". Others, Rusconi (1826), Goodsir, and Barry (1840) also observed "the reproduction of cells by—division of the nucleus of the parent cell—". Mauro Rusconi, in 1826, 127 years ago, observed the proliferation of cells by division. "Virchow demonstrated that cells were reproduced by division of the nucleus and cytoplasm rather than from Schleiden's unorganized cytoblast". (Castiglioni-Krumbhaar) Karl Rokitansky, Professor of Pathological Anatomy at Vienna (1844-1874) for thirty years, one of the greatest of all gross descriptive pathologists, performed perhaps, forty-thousand autopsies, and gave us his *Handbuch der pathologischen Anatomie* (1842-1846), was a contemporary of Virchow. Rokitansky was seventeen years old when Virchow was born (1821). Politically, Virchow was an ardent democrat, and a fiery adversary of Bismarck in the Reichstag.

Adolf Kussmaul (1822-1902) Professor of Medicine at Strasbourg, died fifty years ago (1902). He studied at Heidelberg and at Würzburg. At 35 he became Professor of Medicine at Heidelberg (1857). Kussmaul demonstrated acetone in the blood, in acidosis. W. Petters found acetone in the urine of diabetes (with acidosis). Kussmaul and Maier described periarteritis nodosa (1866)[28]. Carl Rokitansky (1804-1878) previously reported, with necropsy findings, a case of periarteritis, with involvement of the mesentery and the gastrointestinal tract (1848), in his *Diseases of the Arteries* (1852). Kussmaul described progressive bulbar paralysis (1873), and diabetic coma with acetonemia. He observed (1873) the *pulsus paradoxus*, which he so named[29,31]. Griesinger (1854) and A. Widen-

mann (1856) previously observed this peculiar pulse. He used the stomach tube for gastric lavage in dilatation of the stomach (1867-1869). In 1869 he attempted esophagoscopy, as did also Sir Morell Mackenzie. Gustav Killian (1860-1921) removed an aspirated bone from the trachea using a modified esophagoscope! Chevalier Jackson (Senior) of Philadelphia, devised a practical esophagoscope with light in 1902—fifty years ago. Kussmaul described the peculiar breathing (fearful "air-hunger") associated with diabetic coma (1874)[30]. He diagnosed mesenteric embolism in the living patient (1864). He is considered to be among the first to attempt (1860) esophagoscopy and gastroscopy. He employed thoracentesis in 1868, and treated peptic ulcer with large doses of bismuth! Before coming to Strasbourg (1876), Kussmaul was Professor at Heidelberg (1857), Erlangen (1859), and Freiburg (1863). He wrote *Jugenderinnerungen* (1899), an excellent medical autobiography.

These rather brief tributes and comments on the several anniversaries of leaders in medicine, surgery, and pathology are reminders of great periods and eras in medicine, and of eminent men in their respective specialties and fields of interest. All too often epochal contributions are forgotten and their names, tragically, but gradually are permitted to fade away. "Lest we forget! Lest we forget!"

HYMAN I. GOLDSTEIN

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BOOK REVIEWS FOR GASTROENTEROLOGISTS

MODERN MEDICAL MONOGRAPHS—CLINICAL PROGRESS IN CARDIOVASCULAR DISEASE: Edited by Herrman L. Blumgart, M.D., Physician-inChief, Beth Israel Hospital and Professor of Medicine, Harvard Medical School, Boston, Mass. 143 pages. Grune & Stratton, New York, N. Y., 1952. Price $4.50

This small monograph, second of a series of medical monographs, published by Grune & Stratton, is edited by an experienced clinician, cardiologist and teacher. There is an interesting symposium on "Atherosclerosis" with questions and answers by Louis N. Katz, Ancel Keys, John W. Gofman and his associates. They instructively present "Blood Lipids and Human Atherosclerosis". "The Management of Acute Cardiac Emergencies" by Clarence E. De La Chapelle and D. Alan Rose is well presented. Edward F. Bland discusses "Surgery for Mitral Stenosis". A. C. Ernstene and M. D. Altschule contribute two interestingly helpful chapters.

This is a monograph all physicians, internes, residents, clinicians and cardiologists should read.

ANY QUESTIONS: A selection of questions and answers published in the British Medical Journal. First series. 240 pages. Grune and Stratton, Inc., New York, N. Y., 1951. Price $2.50

With a preface by the editor, Dr. Hugh Clegg, London, this helpful, practical little book with questions and answers will be welcomed by medical students, residents, internes and general practitioners of medicine.

Among the topics discussed are allergy (angioneurotic edema, food allergy, hay fever, bee stings), anesthesia, blood disorders (anemia, hemophilia, lymphatic leukemia, polycythemia), cancer (cervix uteri, vesical cancer, implantation cancer; stilbesterol, teropterin, etc.), hypertension, rice diet, heart sounds, varicose ulcers, dermatology (acne, chilblains, dermatitis, psoriasis, ringworm, hair and scalp, etc.), endocrinology, fevers, forensic medicine and toxicology, gastrointestinal diseases (achlorhydria, hypo- and hyperchlorhydria, bowel distention, fecal incontinence in the aged, bacillary dysentery, diet for total gastrectomy, enterospasm and spastic colitis, sprue, vagotomy, smoking and peptic ulcer, constipation, diarrhea, salmonella typhi murium, etc.) and other interesting subjects including tuberculosis, nutrition, heredity and disease, urinary disorders, worms, etc.

MISTAKES IN CLINICAL DIAGNOSES: M. Buerger, 480 pages, 209 illustrations, some in color. Georg Thieme Verlag, Stuttgart, Germany, 1953. Price $13.90.

This is one of the most instructive books, which has come to the attention of the reviewer. Only a physician of the widest experience and the greatest knowledge is willing to admit to an erroneous diagnosis. Buerger has written a book, in which he discusses the mistakes made in order that we avoid them in our own practice.

The first part of the book deals with the general concept of diagnosis, especially with the early recognition of the diseases. He emphasizes that the therapy, either in improving or aggravating the conditions, is able to clear up some cases. The second part of the book deals with the pathology according to different organs. On the basis of 170 cases the author discusses the different diseases and the wrong interpretation of their symptoms. The wrong diagnosis is put opposite the correct one as a heading at the beginning of each case. Based on these cases, he discusses the reason for missing the diagnosis and the pitfalls. All laboratory and roentgenological findings are given. The roentgenograms are very illustrative. The surgical and autopsy observations are shown in illustrations.

The book is very well written. The case reports are clear, containing all necessary data. The illustrations are of excellent quality. There are foot notes on every page giving the bibliography for further study.

We can recommend this book very highly to all clinicians and general practitioners. They will enjoy reading it. Buerger can be congratulated on his publication and for his courage in writing such a book.

BONE TUMORS: Louis Lichtenstein, M.D., Senior Pathologist, General Medical and Surgical Hospital, Veterans Administration Center, Los Angeles, Consultant in Bone Tumors, Tumor Registry of the California Medical Association Cancer Commission, Formerly Associate Pathologist, Hospital for Joint Diseases, New York, Sometime Lecturer in Bone Pathology, Medical Extension, University of California at Los Angeles. 315 pages with 155 illustrations. The C. V. Mosby Co., St. Louis, Mo., 1952. Price $10.50

This work according to the author, is the outgrowth of a long series of studies on primary tumors of the bone, pursued in collaboration with Dr. Henry L. Jaffe at the Hospital for Joint Diseases.

This volume on "Bone Tumors" is written by an experienced pathologist in this particular field, who has been actively engaged in his specialty for two decades.

The author discusses roentgenographic interpretation of skeletal lesions, and the classification of primary tumors of bone (42 references to the literature). Among the conditions satisfactorily and adequately presented are osteochondroma, enchondroma, benign chondroblastoma, chondromyxoid fibroma, osteoidosteoma, osteogenic fibroma of bone and non-osteogenic fibroma.

Informative and instructive presentations are those on "giant-cell tumor" (chapter 10), tumors of vascular origin (hemangioma, hemangioendothelioma, hemangiopericytoma), neurilemma, malignant schwannoma, neurofibroma, osteogenic sarcoma, Ewing's sarcoma, multiple myeloma, liposarcoma, carcinomatous metastases to the skeleton, bone changes in leukemia and Hodgkin's disease and primary reticulum-cell sarcoma. In chapter 21, the author discusses adamantinoma of limb bones and emphasizes that the tumor tissue is highly radio-resistant and that surgical excision or ablation affords the only means of cure.

The illustrations are excellent, the paper of good quality—the publishers and the author are to be congratulated on a fine monograph.

This book is recommended for all orthopedic surgeons, pathologists, radiologists, all physicians, residents and fellows interested in diseases of the bones.

PERSPECTIVES IN HUMAN MALNUTRITION—A Contribution to the Biology of Disease from a Clinical and Pathological Study of Chronic Malnutrition and Pellagra in the African: Joseph Gillman, D.Sc., M.B., B.Ch. and Theodore Gillman, M.Sc., M.B., B.Ch., Departments of Physiology and Anatomy, Medical School, University of the Witwatersrand, Joint Nutrition Union of Council of Scientific and Industrial Research and the University of the Witwatersrand, Johannesburg, South Africa. 584 pages. Grune and Stratton, Inc., New York, N. Y., 1951. Price $18.00.

This work reports the authors' own experiences with malnutrition in the Johannesburg African (native) in the clinic. The authors discuss pellagra, including environment, histopathology, clinical features of skin lesions and also functional relations of the skin in malnutrition.

Dermatoses and therapy, reactions of the alimentary tract in malnutrition and the liver in malnutrition and pellagra are interestingly and informatively presented.

The authors discuss the fatty and anoxic liver, the pigmented (iron-containing) liver, liver disease and pellagra, nutritional edema, the endocrine glands in malnutrition, the nervous system and malnutrition, the general adaptation syndrome of Selye and the macromolecular syndrome in malnutrition.

An exhaustive bibliography of 47 pages, an authors' index and a subject index complete the work.

JEWISH MEDICINE: Solomon R. Kagan, M.D. 575 pages. Medico-Historical Press, Boston, Mass., 1952. Price $10.00

"Jewish Medicine" by an indefatigable, hardworking scholarly author of experience, is an informative labor of love—the result of several years of persistent research and investigation under great physical handicap, following serious illness and retirement from general practice.

This work is recommended to all libraries,

physicians, scholars, biographers and others interested in historical, cultural and biographical medicine.

The volume contains sections on ancient Jewish medicine, medieval Jewish medicine, the renaissance period and modern Jewish medicine.

This volume is published on the occasion of the sixtieth birthday anniversary of its author under the auspices of a committee of his friends, colleagues and admirers.

Among those on the commitee are Professors Albert Einstein, Felix Mandl, Max Newburger, Arturo Castiglioni, Bernhard Zondek, Toni Gordonoff, Louis Finkelstein, Reuben L. Kahn, George Sarton; Drs. Samuel Weiss, Iago Galdston, Walter Pagel, R. Friedman, Joseph H. Pratt, Morris Fishbein and others.

The book contains some fascinatingly, interesting information on biblical medicine, talmudic medicine, ancient Jewish medicine and medieval Jewish medicine. This work may be happily and profitably added to the scholar's shelf along with the works of Julius Preuss, Harry Friedenwald, M. Newburger, J. L. Pagel, Brin Wilhelm Ebstein, Moritz Steinschneider, August Hirsch, Judah Loeb Kazenelson, Isidore Simon, Charles Singer and others.

DIAGNOSTIC BACTERIOLOGY—A Textbook for the Isolation and Identification of Pathogenic Bacteria: Isabelle Gilbert Schaub, A.B., Technical Director, Clinical Bacteriology Laboratories, The Johns Hopkins Hospital, Instructor in Bacteriology, The Johns Hopkins University Medical School and the Nurses Training School, The Johns Hopkins Hospital and Sinai Hospital, and M. Kathleen Foley, M.A., Instructor in Bacteriology, Department of Biological Science, College of Notre Dame of Maryland, Formerly Bacteriologist in charge of the Diagnostic Bacteriological Laboratory of the Medical Clinic, The Johns Hopkins Hospital. Fourth Edition. 356 pages. The C. V. Mosby Co., St. Louis, Mo., 1952. Price $4.50

This practical, concise and very satisfactory volume, now in the new fourth edition, on diagnostic bacteriology (pathogenic bacteria) fills a definite need. This work, by expert bacteriologists, will make it much easier to isolate and identify many of the pathogenic bacteria for students, investigators, epidemiologists, laboratory technicians, bacteriologists, physicians and surgeons interested in such studies. The sixteen chapters adequately and satisfactorily cover the all important essentials and will serve as a practical text for colleges and universities in the undergraduate classes medical bacteriology and in graduate schools and public health departments. Blood cultures, urine and spinal fluid cultures, cultures for fungi and for myobacterium tuberculosis are informatively presented.

The enterobacteriaceal, streptococci and pneumococci are adequately though briefly considered. There are some brief comments on "Determination of the Sensitivity of Bacteria to Antibiotics", "The Test Tube Serial Dilution Method for Determining Sensitivity to Antibiotics" and "Test Tube Agglutination Tests" (on patients' sera).

Consideration is given to the preparation of media, staining methods, reagents and tests.

The reviewer recommends the compact, instructive volume to all those interested in diagnostic bacteriology.

SELECTED WRITING OF SIR WILLIAM OSLER—With an Introduction by G. L. Keynes, M.D., F.R.C.S. 278 pages. Geoffrey Cumberlege—Oxford University Press, New York, N. Y., 1951. Price $4.00.

This fascinatingly interesting book by a committee of the Osler Club of London with the help of W. W. Francis, is a centenary tribute to their patron saint, Sir William Osler. The editor's note is by Dr. Alfred White Franklin and the introduction is by Dr. G. L. Keynes, Dr. W. W. Francis and Mr. R. H. Hill are shown in a fine photograph at work on the Catalogue at 13 Norham Gardens (in the consulting room). There is a fine Osler likeness (by Notman, Montreal) at 60, on the frontispiece.

The sixteen chapters, the appendix, the supplementary note and the excellent subject index all form a volume of interest to all Oslerian students, biographers, medical historians and scholars. All physicians, students, librarians and cultured men in gen-

eral, will profit by reading this centenary tribute by the Osler Club of London. The old humanities and the new science, Sir Thomas Browne, Robert Burton, Michael Servetus, William Beaumont, the young Laennec, the student life, the growth of truth, a way of life, collecting a library, are the topics enlighteningly and fascinatingly covered. The reviewer gladly recommends this volume to a wide circle of readers.

KYMOGRAPHISCHE RONTGENDIAGNOSTIK—Zur Beurteilung des Herzens in Beispeilen: Prof. Dr. Pleikart Stumpf mit 164 Abbildungen. 120 pages. Georg Thieme Verlag, Stuttgart, Germany, 1951. Price D.M. 25.50

This practical monograph on "Kymographic Roentgendiagnosis" by Professor Pleikart Stumpf with 164 illustrations is a welcome addition to the rapidly increasing number of books on various phases of studies of diseases of the heart and blood vessels and congenital anomalies. Unfortunately there is no English translation of this monograph available yet. All roentgenologists, cardiologists and clinicians interested in cardiology who can read German should have a copy of this work.

The author has had many years of experience in the study of kymograms. This is an authoritative work based on the author's own experience. Students of cardiology everywhere should welcome the instructive information contained in this volume.

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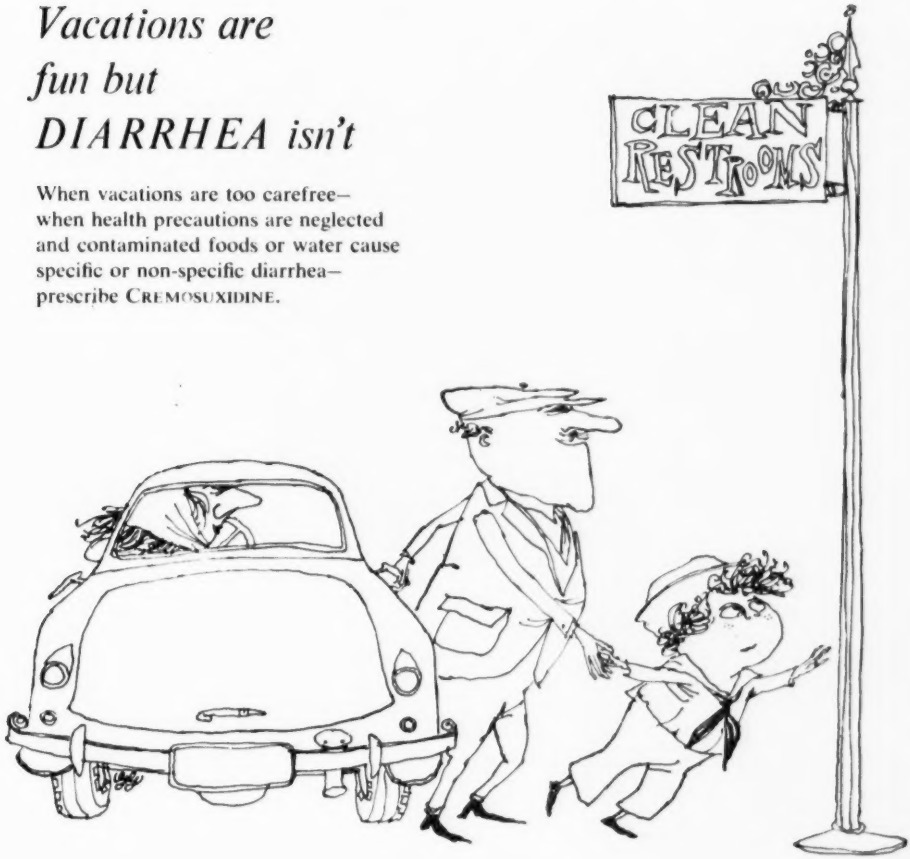

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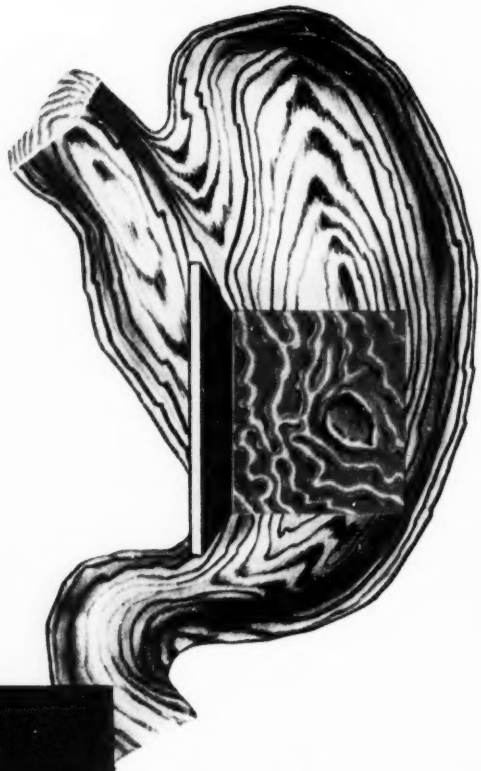

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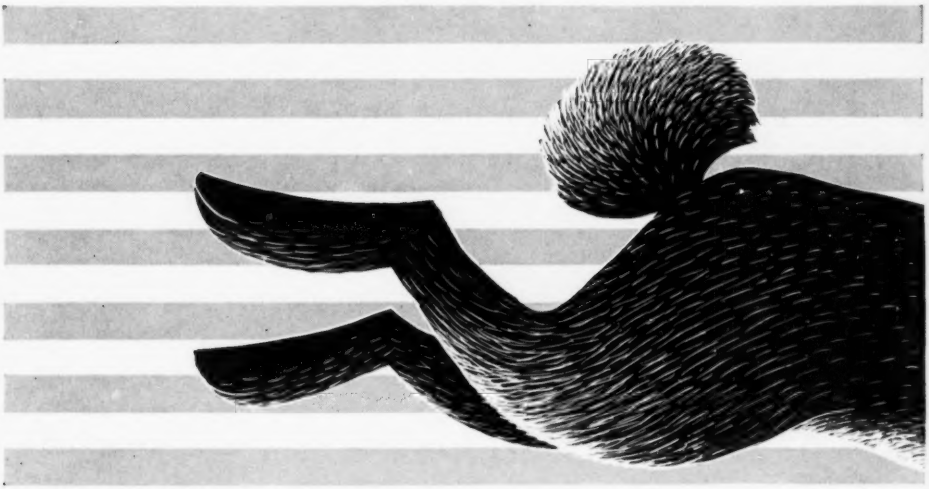

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